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Influence of Clinical Instructor and Physical Therapist Student Characteristics on the Use of Standardized Tests and Measures in Clinical Practice

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Influence of clinical instructor and physical therapist student characteristics on the use of standardized tests and measures in clinical practice

by
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Approval/Signature Page

We hereby certify that this dissertation, submitted by Vicki LaFay, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirement for the degree of Doctor of Physical Therapy.

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ABSTRACT

Problem Statement: Physical therapist (PT) students report discord between what they learn in the academic environment and what they experience in clinical practice. Despite increasing reporting requirements, standardized tests and measures (STMs) are not well integrated into routine clinical practice. The primary purposes of this study were to (1) examine clinical instructor (CI) and PT student characteristics and beliefs that influence the use of STMs in clinical practice, and (2) explore alignment between the STMs students learn during academic preparation to those commonly reported in clinical practice. **Procedures/Methodology:** In this mixed method sequential explanatory study, participant demographic characteristics, perceived STM confidence, value, attitudes/beliefs, and use were examined for relationships. PT students (n=123) and CIs (n=127) were surveyed during a terminal clinical experience (CE). Surveys were validated for face and content validity and internal consistency. A purposively selected subset of PT students (n=8) and CIs (n=9) were interviewed. **Results:** Significant, fair to moderate correlations were found between constructs of value, use, and confidence for both groups. Significant differences in STM value change were found between CIs and PT students. Significant change in student confidence in STM selection, administration, and interpretation occurred over the CE. Differences in STM selection confidence change by clinical focus area, and setting were identified. Clinical instructor APTA member status and number of students supervised were correlated with STM value and use constructs. A significant relationship was found between extrinsic and intrinsic drivers for STM use. Barriers and concerns regarding STMs are prevalent, with differences by practice setting and patient/client populations noted. Five primary themes and twelve

subthemes were identified and consistent across groups. Report of STM use was high, although both groups identified concerns with STM suitability and applicability. Both groups felt students brought new knowledge to the clinic; neither group asserted definitively that this led to lasting change in practice as a result. **Significance:** Results from this study provides a clearer picture of the current state of STM utilization in PT practice, may guide efforts to advance STM use, and could aid academic programs in establishing priorities and teaching strategies for STM education within the curricula.

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CHAPTER 1: INTRODUCTION

Introduction

This dissertation was developed to describe the current state of standardized tests and measures (STM) used in physical therapist clinical practice, and examine attitudes and behaviors that influence the use of STMs from physical therapist (PT) student and clinical instructor (CI) perspectives. This dissertation report includes a statement of the research problem and its relevance, specific research questions and associated theories, a review of the literature, and a detailed description of methodology. The results, analyses, limitations, and delimitations of quantitative and qualitative findings are examined. Recommendations for future research and implications of these results are presented.

In this first chapter, the challenges and benefits of STM integration into routine clinical practice are reviewed. The impact on PT education and clinical practice is described. The relevance, significance, and need for this study are discussed in relation to PT student education, the profession of physical therapy, and the broader perspective of healthcare in general. Specific research questions are posed to identify what will be investigated and corresponding null hypotheses are presented. Operational definitions of terminology are provided for reader clarity.

Background

The American Physical Therapy Association (APTA)'s *Guide to Physical Therapist Practice*[1] defines STMs as those that have specified protocols for administration or incorporate a closed-ended questionnaire format, provide quantifiable information about the patient, and have sound psychometric properties.[1,2] Standardized outcome measures are standardized tests used to evaluate change in patient performance

from before to after an intervention.[2] The *Guide* notes that "obtaining measurements is an essential and integral part of physical therapist practice"[1] for the assessment of intervention effectiveness, screening, diagnosis, and clinical decision-making. The APTA established the Evaluation Database to Guide Effectiveness (EDGE)[3] taskforce in 2006 to support and advance this ideal, with a goal to identify the best outcome measures for each physical therapy clinical practice area.[3] The EDGE taskforce asserts that a first step for optimal PT practice "by all physical therapists, for all the patients we treat, is the identification and selection of the most appropriate outcome measures."[3] The Commission on Accreditation in Physical Therapy Education (CAPTE),[4] the only accreditation agency for entry-level physical therapist education programs recognized by the United States Department of Education and the Council for Higher Education, is also in support of this clinical practice expectation.[4] CAPTE requires entry-level physical therapist programs to provide instruction in the selection, implementation, and interpretation of tests and measures.[4]

The impetus to use STMs as part of evidence-based physical therapist practice is not just a noble vision for the profession. Regulatory agencies and payors, like Medicare, are increasingly requiring reporting of outcome measures across the health professions. The Centers for Medicare and Medicaid Services (CMS) established the Physician Quality Reporting System (PQRS) in 2006 to help reduce fraud and optimize payment reform.[5] Through 2016, healthcare professionals participating in the PQRS program were required to report on nine or more outcome measures across three of the six National Quality Strategy (NQS) domains for at least 50% of their Medicare Part B fee-for-service patients.[5] These NQS domains encompassed (1) personal and caregiver-centered

experience outcomes, (2) patient safety, (3) communication and care coordination, (4) community, population, and public health, (5) efficiency and cost reduction use of healthcare resources, and (6) effective clinical care.[5] Although Medicare outcome measure reporting requirements have changed with the transition to the Merit-based Incentive Payment System (MIPS) in 2017, outcome measure reporting remains critically important for measuring quality performance and justifying payment for services.[6] Physical therapists became eligible to participate in this program in 2019.[6] Most healthcare payors align with these CMS expectations for documentation of outcome measures and evidence of medical necessity for an episode of patient care, e.g. care that is "justifiably reasonable and necessary according to evidence-based clinical standards of care."[7]

STMs are not well integrated into routine clinical practice for qualification and reimbursement of healthcare services, quality assurance, and per professional practice guidelines despite the increasing reimbursement and regulatory guidelines for the reporting of outcome measures. Duncan et al[8] found this to be consistent across the allied health professions with organizational support and prioritization, individual patient factors, and practical issues such as time to administer, difficulty scoring, and clinician exposure, knowledge, and beliefs negatively impacting routine outcome measure use.[8]

Numerous studies have examined physical therapists' self-reported perception of benefits, barriers, limitations, and use of STMs.[2,9-22] In a 2009 study by Jette et al,[2] approximately 48% of physical therapists reported using STMs; however, considerable variability was noted in frequency of use by respective clinical practice setting.[2] The odds that a physical therapist in outpatient practice routinely used standardized outcome

measures was seven times greater than a therapist in the acute care setting and 12 times greater than their home health counterparts.[2] Of the 52% of respondents in the 2009 study by Jette et al[2] that indicated they did not use STMs, nearly half indicated they did not intend to change this pattern of behavior in the future.[2]

A 2012 qualitative study by Wedge et al[22] explored physical therapists' perceptions about factors that influence their decision to use outcome measures, specifically looking at the impact of practice setting (inpatient rehabilitation, outpatient clinic, and skilled nursing facility) and characteristics of therapists who did and did not routinely use outcome measures.[22] Findings were consistent with the limited but suggestive evidence that higher degree attainment, APTA membership status, and fewer years in clinical practice may be associated with the use of outcome measures, as well as the premise that multilevel determinants, consistent with those described by Duncan and Murray,[8] impacted use and value associated with outcome measures.[2,9-17,19-24] Further exploration into individual clinician characteristics and multilevel determinants that influence STM behaviors in clinical practice has been recommended.

In preparation for the "hands-on" nature of physical therapist clinical practice, PT students learn not only in the classroom and clinical laboratory but also in clinical practice environments. According to CAPTE, PT students spend an average of 38 weeks in full-time clinical education during their professional preparation under the guidance of licensed physical therapists that serve as clinical education faculty, more commonly known as clinical instructors (CIs).[25] The CAPTE standards dictate that clinical education faculty utilized by accredited physical therapy programs should have a "minimum of one year of clinical experience and demonstrate clinical competence in the area of practice in

which they are providing clinical instruction " and be "effective" in their clinical teaching.[4] Measuring effectiveness and mentoring the many individuals involved in clinical education is difficult for physical therapist education programs; balancing the CI role with the many responsibilities of clinical practice is also challenging for physical therapists. PT programs are not always successful in meeting the unique individualized needs of these CIs and ensuring consistency across clinical education experiences for PT students.[26-28] According to Applebaum et al,[26]

> Because clinical education experiences are courses, we educators cannot abrogate our responsibility for making them a cogent and integrated part of a program's full curriculum. We would never offer an academic course without knowing who the instructor will be, or what his or her qualifications are; we would never expect an instructor to teach a class without knowing what students have already learned, or how they are expected to integrate that knowledge with their other courses; we would never include a course in the curriculum without a foundation for it; and we would not expect faculty to teach a course without understanding the program's educational philosophy—yet we do all of these things in clinical education. The gap between clinical practice and academic teaching is a symptom of the structure of physical therapist clinical education, with no formal collaboration between the clinical and academic programs to integrate learning experiences or to deal with the many barriers created by regulatory policies, productivity expectations, instructor qualifications, and other complexities of the clinical environment.[26(p31)]

Consistent with the sentiments expressed in Applebaum's statement,[26] physical therapist students often report discord between what they learn in the academic environment and what they experience in clinical practice. Dutton and Sellheim[29]

explored this "academic-clinical dissonance" between the classroom and clinic in a 2014 qualitative study of physical therapist students.[29] Dissonance themes that emerged were in the areas of patient examination, application of evidence-based practice, productivity, reimbursement, and documentation.[29] The common response to dissonance in these areas was frustration and stress, typically leading to student inaction and deference to clinical practice.[29,30]

Problem Statement

Research indicates that the relationship between student and clinical instructor affects the quality of learning during clinical education experiences[31-34] and that clinical instructors influence the evidence-based practice (EBP) behaviors of physical therapist students.[34,35] Limited use or negative attitudes toward EBP by clinical instructors may adversely influence students' decisions to follow recommended EBP guidelines as entry level clinicians.[35] As the use of STMs is recognized as a critical element of evidence-based practice, these findings may be anticipated to extend to attitudes and behaviors related to STMs as well. There is a limited body of research related to PT student impact on clinical instructor EBP behaviors. In a study by Sabus et al,[24] a student-driven EBP educational project was not found to have a statistically meaningful impact on CIs' evidence-based clinical behaviors.[24] No research was identified that specifically explored PT student influence on CI attitudes and behaviors associated with STMs.

Overview of Study Design

A mixed methods sequential explanatory design, as defined by Creswell,[36] was employed. Collection and analysis of quantitative data occurred, followed by collection

and analysis of qualitative data. The qualitative phase of the study and subsequent results assisted in explaining and interpreting the findings from the quantitative phase.[36]

Relevance and Significance

Healthcare in the U.S. is changing, and as a profession, physical therapists must consistently provide evidence of physical therapy's value to clients/patients, referral sources, and payors. The American Physical Therapy Association has "expressed a commitment to the development and use of evidence"[37(p5)] with a focus on outcomes as a critical component of an evidence-based patient/client management process. To this end, STMs provide a valuable means to measure and evaluate outcomes related to "progress over the course of an episode for a single individual, as well as a comparison across patients/clients with similar issues."[37(p5)] New graduates, however, report a decline in their "sense of relevance" and commitment to evidence-based practice within the first two years after graduation.[38] Physical therapists that do not routinely use STMs report being unlikely to change this pattern of behavior.[2] Without a deeper understanding of factors that contribute to high levels of STM use and valuation, the existing pattern of inconsistent and poorly integrated STM use, as an element of EBP, is likely to persist, regardless of current efforts to promote STM use during physical therapist academic preparation.

Research has not specifically and comprehensively explored factors that influence STM integration into practice from the perspectives of clinicians as CIs and their PT students after a terminal clinical experience (CE). Students may provide a valuable perspective on STM use in the clinic; adding their direct observations and experiences to that of their CIs may provide a more accurate view of STM use in contemporary clinical

practice. These clinical observations and reflections may provide insight into the alignment or conflict between academic preparation and clinical reality.

Although CEs are focused primarily on what the student will achieve through learning from the CI, clinicians acknowledge that students can "create a two-way learning interaction"[39(p229)] by bringing academic knowledge into the clinic. While clinicians report this benefit, the literature provides limited evidence of a direct influence on STM use or EBP clinical behavior integration into practice during clinical education.[34] Research that would explore the student/CI relationship from this context may provide educators insight into more effective preparatory strategies for students entering the clinical environment and for clinical instructor training. This is important as the value of clinical teaching must be continually balanced against the time, effort, and cost for a clinician and their organization to support a clinical education program.[27] The knowledge gained from this research may provide not only a clearer picture of the current state of STM utilization in PT practice, but also guide efforts to advance STM use, and aid academic programs in establishing priorities and teaching strategies for STM education for entry-level practice.

Research Questions and Hypotheses

The primary purpose of this sequential explanatory mixed methods study was to examine clinical instructor (CI) and physical therapist (PT) student characteristics and beliefs that influence the use of STMs in clinical practice. A secondary purpose was to explore the alignment or conflict between the STMs students learn and use during their academic preparation to those commonly reported in contemporary clinical practice. In order to address the purpose of this study, several research questions were addressed

through survey methodology and semi-structured interviews. The variables to be explored encompassed participant demographic characteristics and rationale, use/knowledge, and value associated with STMs.

Phase 1: Quantitative Research Questions

1. What CI and PT student characteristics are associated with or predictive of STM attitudes or behaviors?
2. What differences exist between CIs and PT students on (1) STM knowledge/use, and/or (2) perception of STM value?
3. How do opinions, attitudes, or behaviors associated with STMs change for CIs or PT students after a CE?
4. What PT student or CI characteristics are associated with or predictive of a change in attitudes or behaviors in STMs in their clinical partner after a CE?

Based upon these research questions, null hypotheses corresponding to these questions were generated.

Quantitative Research Hypotheses:

1. H_0: CI and PT characteristics will not be associated with, or predictive of, STM attitudes or behaviors.
2. H_0: No differences will exist between CIs and their PT students in STM knowledge/use and/or perception of STM value.
3. H_0: No change will exist in CI or PT student report of attitudes or behaviors associated with STMs after the CE.
4. H_0: PT student and CI characteristics will not be associated with, or predictive of, a change in attitudes or behaviors in STMs in their clinical partner after a CE.

Phase 2: Qualitative Research Questions

The qualitative phase of this study began with an exploration of the lived experience of being a CI or student during a terminal CE as is consistent with a phenomenological approach. An in-depth and rich exploration of the expectations, benefits, and challenges CIs experience in their role as a CI occurred through a semi-structured interview process. Student perspectives in these topic areas were gathered in parallel. Factors that influence STM use and value as an element of an evidence-based patient management process were more specifically addressed for both groups through a series of probes. Based on participant responses, CI views related to the impact they feel they have on the way their students will practice, the potential influence students may have on their clinical practice, and the use and beliefs related to STMs were explored further. For PT students, the same broadly encompassing question related to what influences their use of STMs as a student were employed. The PT student interview explored factors students anticipate will have the greatest impact on how, when, and why they will use STMs as entry-level practitioners and if they feel they have influenced the way their CI uses or feels about STMs. As the intent of the qualitative component of this sequential explanatory mixed method design was to also explain and interpret findings from the quantitative phase, questions were more fully defined after survey data collection, analysis, and interpretation was complete.

Definitions of Terms

Academic-clinical dissonance: Cognitive dissonance theory purports that "individuals prefer consistency, or consonance, in their beliefs, attitudes and behaviors, and that inconsistency, or dissonance, tends to result in changes that aim to restore the preferred

state."[40(p77)] Academic-clinical dissonance specifically refers to dissonance between the "academic ideal and the clinical reality."[40(p77)]

Clinical education experiences: "That aspect of the professional curriculum during which student learning occurs directly as a function of being immersed within physical therapist practice. These experiences comprise all of the formal and practical "real-life learning experiences provided for students to apply classroom knowledge, skills, and professional behaviors in the clinical environment."[4(p23)]

Clinical instructor: According to CAPTE's Standards and Required Elements for Accreditation of Physical Therapist Education Programs,[4] clinical instructors are "licensed physical therapists, with a minimum of one year full time (or equivalent) post-licensure clinical experience".[4(p15)]

Confidence: Confidence is the "belief in oneself and one's powers and abilities."[41]

Contemporary practice: Contemporary practice is the "delivery of physical therapy services as documented in current literature, including the *Guide to Physical Therapist Practice*, the Standards of Practice and the Code of Ethics."[4(p19)]

Demographic characteristics: Demographic characteristics are statistical data about the attributes of a population. In this study, demographic characteristics of CIs and PT students such as age, gender, terminal degree, grade point average, will be collected and analyzed.[42]

Evidence-based practice (medicine): According to Sackett et al,[43] "Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external

clinical evidence from systematic research. By individual clinical expertise we mean the proficiency and judgment that individual clinicians acquire through clinical experience and clinical practice. Increased expertise is reflected in many ways, but especially in more effective and efficient diagnosis and in the more thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences in making clinical decisions about their care. By best available external clinical evidence we mean clinically relevant research, often from the basic sciences of medicine, but especially from patient-centred clinical research into the accuracy and precision of diagnostic tests (including the clinical examination), the power of prognostic markers, and the efficacy and safety of therapeutic, rehabilitative, and preventive regimens."[43(p71)]

Physical therapist student: a student actively enrolled in an accredited physical therapy program in the United States.

Self-efficacy: Self-efficacy is an individual's belief and confidence in his or her "capacity to execute behaviors necessary to produce specific performance attainments."[44]

Standardized measures: The *Guide to Physical Therapist Practice* defines standardized tests and measures as those that have specified protocols for administration or incorporate a closed-ended questionnaire format, provide quantifiable information about the patient, and have sound psychometric properties.[1] Standardized outcome measures are standardized tests used to evaluate change in patient performance from before to after an intervention.[2]

Terminal clinical experience: "An extended full-time experience that occurs at the end of the professional curriculum" after all didactic content in the curriculum has been completed.[4(p20)]

Value: Value is defined as the "relative worth, utility, or importance".[45]

Summary

This first chapter has introduced the current state of and the associated challenges with integration of STMs in physical therapist clinical practice. A number of factors have been identified that potentially influence the perceived value and use of STMs in clinical practice. The importance of a deeper understanding of factors that contribute to the existing pattern of inconsistent and poorly integrated STMs despite efforts to promote their use during PT entry-level professional education has been established. The purpose, relevance, research questions, and hypotheses for this study are presented. This study will contribute to the body of literature focused on identification of facilitators and barriers to the use of STMs, an element of evidence-based practice, through the dual perspectives of CIs and PT students.

CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

In this chapter, the historical relevance and importance of utilizing STMs as an element of evidence-based practice (EBP) and as part of academic professional preparation are explored. It would be remiss to not discuss the topic of EBP before delving into STMs; the commitment to the use of STMs in clinical decision-making and evaluation of patient/client outcomes is a hallmark of the practice of an evidence-based clinician. A historical overview of research literature on the development and integration of EBP and STMs from the broader healthcare perspective and, more specifically, for physical therapists and physical therapist students are presented. Educational, organizational, and psychosocial theories that may explain attitudes and behaviors related to EBP and STM use are provided. This chapter also includes exploration of research related to the influence of the CI/student relationship and potential for disparity between academic preparation, professional practice expectations, and contemporary clinical practice. A summary of the gaps in the literature surrounding the development and integration of STMs, an element of EBP, into clinical practice are discussed. Information in this chapter substantiates the need to investigate the relationship between these variables.

Historical Overview of Evidence-based Medicine and Standardized Tests and Measures

Evidence-based Practice in the Health Professions

The term "evidence-based medicine (EBM)," often used synonymously with evidence-based practice (EBP), first appeared in print in a 1991 editorial by Dr. Gordon Guyatt.[46] The term EBP was coined by Guyatt to describe the core curriculum of the

internal medicine residency program at McMasters University, although the philosophical origins can be traced back to the mid-19th century in Europe.[47,48] The most commonly known definition of EBP, however, is attributed to Dr. David Sackett, a colleague of Guyatt, who defined EBM as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integration of clinical expertise, patient values, and the best research evidence into the decision making process for patient care."[43(p71)]

Guyatt, Sackett, and like-minded colleagues proposed the need for a paradigm shift in the practice of medicine in the 1990s; efforts to move to a more scientifically-focused method of medicine had not met the level of universal awareness and emerging acceptance in medicine until the 1990s.[47,48] The Journal of the American Medical Association (JAMA) demonstrated a strong commit to this vision with a series of more than 32 articles supporting EBM in the journal over the next dozen years.[48] The prolific publication efforts of the McMasters University faculty, catchy and intuitive name for the approach, and support by JAMA have been credited with turning the tide toward EBM as both a medical movement and as a methodological approach.[48] Although originally defined in the context of medicine, this evidence-based approach to patient/client management has been widely accepted as the clinical practice ideal for the allied health and social work professions as well.[49]

Sackett[43] proposed a five-step model to aid healthcare practitioners in developing the critical skills necessary for EBP (*Figure 1. The five steps of evidence-based practice*). The five steps of a more contemporary version of this EBP model are: (1) ask a question, (2) find the best evidence, (3) evaluate the evidence, (4) apply information in

combination with clinical experience and patient values, and (5) evaluate outcomes.[43,49] This model is typically represented as a cycle through which the EBP process guides and informs future questions and practice. When viewed as a continuous improvement cycle for lifelong learning and growth, practitioners refine their ability to question, search for information, critically appraise, apply and evaluate outcomes that impact patient care in progressively more efficient and effective ways.[46,50]

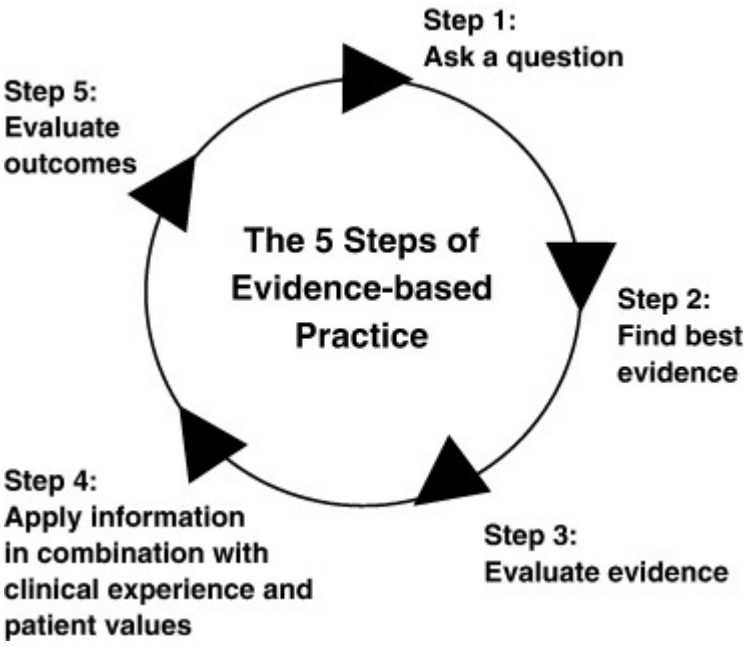


Figure 1. The five steps of evidence-based practice[50]

Two key frameworks have been proposed to describe the process of research implementation consistent with EBP: *research into practice* and *research in practice*.[51] The model of *research into practice* entails a more compartmentalized approach, where research is generated in academia, disseminated from researchers to practitioners, and then utilized by practitioners for patient/client management.[51] This approach is typical of what most healthcare professionals experience during their academic preparation and later in clinical practice, where reading articles, working with students, and attending

continuing education courses may expose them to new evidence. This approach, although the most traditionally encountered, requires notable investment into learner-focused dissemination strategies to "bridge the gap" and lead to actual adoption of evidence-based practices.[51] The literature provides mixed evidence that strategies to promote EBP such as journal clubs, mentorship programs, EBP education programs, and "knowledge brokers" alone are effective.[52]

Research in practice entails building theory from field research and practical experience and not only from academia.[51] In a study in the nursing literature, a research training program was implemented for point-of-care clinicians to facilitate not only awareness and practice of EBP but also to encourage creation of new research evidence at the practice level, i.e. research in practice.[52] The program did create a culture of learning and commitment to EBP, but no significant change was noted in the subjects' willingness to participate in research.[52] Advocates indicate that for either *research into practice* or *research in practice* implementation processes to be successful, there must be sustained active engagement and support from both organizational and individual perspectives to address competing priorities in clinical practice.[51-53] These competing priorities often include productivity and scheduling demands and the availability of physical, financial and knowledge-based resources.[52,53] Despite the limited evidence of success to date, many advocates of EBP feel integration and acceptance of EBP is possible with balancing of these competing priorities.[51,52]

Findings in the medical and allied health literature indicate that despite efforts to translate research into practice and research in practice, the gains from acceptance to adoption are modest and inconsistent at best.[54-58] Grol and Wensing[53] reported that "at

least 30% - 40% of patients do not receive care according to scientific evidence, while 20% or more of the care provided is not needed or potentially harmful to patients."[53(p57)] Two additional studies from the US and Canada, in 2003 and 2007 respectively, found that only half of practicing PTs had formal EBP preparation in their academic training and low self confidence in translation of evidence into practice.[13,23] In the aforementioned 2003 study, a quarter of PTs surveyed indicated they went to the literature less than twice a month to aid in clinical decision-making.[13]

Much of the recent literature related to EBM has focused on success, failure, barriers, and challenges to the integration of EBM into clinical practice. A complex interaction of workplace, individual, and extra-organizational factors have been found to influence the use of research in practice [55] In a study of Swedish physiotherapists, Dannapfel et al[55] identified nine conditions conducive to the use of research in clinical practice.[55] At the individual level, these conditions are attitudes, motivation, and knowledge/skill to use research; at the organizational level, leadership support, organizational culture, research-related resources, and knowledge exchange; and EBP guidelines, external meetings, networking, conferences, and academic research and education were important conditions at the extra-organizational level.[55] Positive individual level influences to the implementation of EBP have also been associated with attitudes toward research, higher degree attainment, association membership, specialty certification and fewer years in clinical practice.[13,34,53,57] Commonly reported barriers to an EBP approach to patient/client management are lack of journal access, poor skills in searching for and evaluating evidence, attitudes, and lack of time or compensation.[13,17,23,53] Lack of time to retrieve, interpret and apply research has been

reported consistently as a barrier across healthcare disciplines and encompasses concerns associated with productivity, staffing and overall lack of organizational support.[57] In a systematic review focused on barriers to EBP guideline adherence, Cabana et al[59] identified that "lack of awareness, lack of familiarity, lack of agreement, lack of self-efficacy (i.e. the belief in one's ability to perform a behaviour), low expectancy of favourable outcomes, inertia/lack of motivation, and perceived external barriers beyond the control of individuals"[59(p1463)] were notable impediments to EBP adoption.

The transition from EBM as a philosophy to clinical reality in an ever-changing healthcare environment has proven difficult across the healthcare professions.[57] Although many clinicians report positive attitudes about EBP, there are widespread differences in EBP knowledge and implementation that persist despite efforts of early EBM pioneers such as Sackett and Guyatt.[13,17,34,53,57,59,60] Federal and state agencies such as CMS and the Agency for Healthcare Research and Quality, accreditation bodies such as The Joint Commission, consumer protection groups such as the Consumer Coalition for Quality Health Care, and commercial and governmental payors of healthcare services are increasingly demanding evidence of optimal, best practice patient care outcomes.[37] Reimbursement, penalties and incentives, certifications and accreditations, are now heavily tied to demonstration of evidence-based patient/client management and reporting of outcomes.[5,61] With these pressures, healthcare organizations are challenged to find ways to positively incentivize -or coerce- clinicians to align with EBP expectations for clinical practice.

Evidence-based Practice in Health Professional Education

The APTA established a vision for the profession, the Vision 2020 statement, in 2000.[1] This vision set forth the expectation for physical therapists to be doctors of physical therapy with a commitment to EBP: "Guided by integrity, life-long learning, and a commitment to comprehensive and accessible health programs for all people, physical therapists and physical therapist assistants will render evidence-based services throughout the continuum of care and improve quality of life for society."[3] The APTA definition of EBP is consistent with that of Sacket et al,[43] with aims to decrease "unwarranted variation in the provision of physical therapy services" and to enhance the patient/client management process.[1]

Delegates attending the second international conference of Evidence-Based Health Care Teachers and Developers held in Sicily in September of 2003 drafted what is now known as the Sicily statement.[49] The Sicily statement is a consensus document published in 2005 that set forth the recommendation that all health professionals be trained in the five-step model of EBP and that this training be integrated into all healthcare entry-level educational programs.[33,49,60,62] Current CAPTE standards are in alignment with this recommendation.[4] Accredited PT education programs are required to meet the "contemporary professional expectations for the preparation of physical therapists";[4] this requirement explicitly defines contemporary preparation as necessitating education and preparation for evidence based practice.[4,33,62]

The majority of the research on entry level EBP education resides in the medical and nursing literature.[34,51,53,54,57-60] Other than positive changes in EBP attitudes, few of these studies have identified that entry level EBP education positively affects the EBP

skills or behavior necessary to translate EBP into clinical practice.[34,51,53,54,57-60] McEvoy et al[60] investigated the impact different EBP training programs had on EBP attitudes, self-reported knowledge, and behaviors of allied health students in 2010.[60] Although significant differences were noted in EBP attitudes, self-reported knowledge, and behaviors of students with more than 20 hours of formal EBP training, specific guidance for EBP training was not generated secondary to insufficient detail provided about the respective EBP training programs.[60] Research from Olsen and colleagues[33,62] from 2013 and 2014 contributed to the PT literature, with findings consistent to that of McEvoy[38,60] and others.[17,63] Confidence and knowledge of EBP improved with EBP education in the classroom; however, students and new graduates did not consistently engage in EBP behaviors in the clinic.[17,33,62,63] Statistically significant changes in EBP behaviors were identified in research exploring integration of EBP learning and practice into both the didactic *and* clinical education components of the curriculum.[34,64] Although this is promising, there are only a few studies exploring this with undergraduate healthcare students; conclusions are further limited by the quality of these studies.[62,64]

In 2011, McEvoy et al[38] explored longitudinal changes in EBP knowledge, attitudes, and behaviors in PT students entering the workforce and at the end of their first and second year of clinical practice.[38] These students had participated in both standalone EBP courses and integrated EBP training in clinical experiences during their entry-level educational program.[38] McEvoy's[38] findings were aligned with that of earlier research into the changes in EBP attitudes, knowledge, and skills of PT clinicians in the first year of clinical practice.[38] Novice PTs in the first year of clinical practice declined in EBP confidence and sense of relevance for research with slight, non-significant improvements

in these areas during the second year of practice.[38] The utilization of EBP in clinical practice by these novice PTs, however, declined during the first year of work and remained low at two-year follow up.[38] Recommendations from this study and related research in medicine and nursing support extension of EBP training into the workplace. Entry level EBP education alone does not "future-proof graduates with the life-long skills required for making evidence-based healthcare decisions;"[38,59] without a conscious shift in workplace culture, support and resources, entry-level EBP education alone will remain insufficient.

Standardized Test and Measures in Physical Therapy and the Health Professions

Standardization of the tests and measures used in clinical practice allows for a common language among clinicians whether for the evaluation of individual or collective patient outcomes, assessment of intervention effectiveness, screening, diagnosis, or clinical decision-making. These STMs should have strong psychometric properties, allowing for enhanced confidence in the results of these tests and measures.[3] Standardized tests and measures provide a valuable means to measure and evaluate outcomes related to "progress over the course of an episode for a single individual, as well as a comparison across patients/clients with similar issues.[37(p5)]

The APTA has "expressed a commitment to the development and use of evidence"[37(p5)] in physical therapist practice and has identified the measurement and evaluation of outcomes as a critical component of an evidence-based patient/client management process. Evidence-based practice curriculum guidelines for doctor of physical therapy education were established by the APTA section on research special interest group in 2014 to lay a common framework across academic programs.[65] The

CAPTE[4] requires educational programs to have a curricular plan that demonstrates students can "select and competently administer tests and measures"[4(p28)] and evaluate the data from tests, measures, and other relevant sources for clinical decision making. The CAPTE[4] requires students have exposure to tests and measures from specific categories, aligned directly with the categories of tests and measures (i.e. aerobic capacity/endurance, balance, gait, motor function) provided in *The Guide to Physical Therapist Practice*.[1] The CAPTE does not, however, provide comprehensive guidance to academic programs as to which tests and measures should be emphasized and leaves much of this to the discretion of each educational program.[4]

Healthcare professionals are experiencing an increased demand for STM reporting, which coincides with these advancing entry-level curricular expectations for instruction in STMs recommended by professional practice organizations. As previously noted, reimbursement for services, penalties for poor performance or incentives for achievement of optimal outcomes, and attainment or maintenance of certifications and accreditations are now heavily bound to the reporting of outcomes. The use of STMs to objectively measure outcomes is perceived as tangible demonstration of evidence-based patient/client management for payors of healthcare services and quality assurance organizations.[5-7]

The Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act of 2010 have had an enormous impact on healthcare delivery in the United States, setting forth quality initiatives and reporting standards to address "safety failures and suboptimal benefits" identified in the U.S. healthcare system.[61] Over the past decade, CMS implemented programs such as the PQRS, which

incentivized providers to voluntarily report on quality indicators in its early stages and, later, mandated reporting to avoid penalties.[5,7] The CMS MIPS began in 2017, replacing PQRS.[6,7] Although Medicare outcome measure reporting requirements have changed with the transition to MIPS, outcome measure reporting remains critically important for the measurement of quality performance and justification of payment for services.[6] Most healthcare payors align with CMS expectations for documentation of outcome measures as a means of establishing proof of care that is "justifiably reasonable and necessary according to evidence-based clinical standards of care ."[7]

The APTA has invested in the development of resources to assist clinicians in the identification and selection of the best tests and measures by patient/client population, practice setting, and purpose. Some of the more notable web-based resources available to physical therapists with APTA membership are the Physical Therapy Journal Outcomes Measurement Collection, the PTNow database of tests and measures, the *Guide to Physical Therapist Practice*, and the EDGE Taskforce recommendations. The Physical Therapy Outcomes Registry was also created by the APTA to gather and combine electronic health record (EHR) data from PT practices that participate in the system.[66] This service is currently the only cross-platform, nationwide physical therapy clinical registry approved by CMS for the 2017 MIPS program.[66] Access to aggregate data from the registry allows participating practices to track and compare themselves against national data.[66] The registry aids in standardizing the collection of patient outcomes and "clinical practice guidelines development and validation from outcomes data."[66] According to the APTA,

> "As health care moves to outcomes-based payment, it will be critical for PTs to have access to real-time clinical data to understand how they perform, identify areas to improve quality, and manage patient populations. Without data, physical therapists will be unable to receive future incentive payments. APTA's Physical Therapy Outcomes Registry will have the ability to extract information from electronic health records, allowing your clinical data to be readily usable and actionable."[67]

The use of STMs in the patient/client management process is widely accepted across the health professions as an important element of EBP. Despite this, STMs are not well integrated into routine clinical practice. This finding is consistent across the allied health professions.[10-22,68,69] The individual, organizational, and extra-organizational factors impacting EBP are also noted in the literature specific to STMs.[8,15,20] Lack of organizational support and prioritization, individual clinician and patient factors, practical issues such as time to administer, difficulty scoring, clinician exposure/familiarity, knowledge, poor access to standardized tools, and lack of resources may negatively impact routine outcome measure use.[8] These factors are found to be common barriers across the health professions and across studies in the United States, Australia, New Zealand, India, United Kingdom, and beyond. [8,10,11,20,22,55,68-70] In a study by Abrams et al,[69] more than 80% of physical therapist survey respondents reported that time to administer tests and lack of familiarity with functional tests were the primary barriers to using outcome measures.[69] In a 2013 study surveying healthcare professionals, 63% cited time as a barrier with 56% indicating lack of familiarity as a barrier.[10] In numerous studies, health professionals have indicated that potential patient-related barriers also exist, reporting that measures may be confusing and too time-consuming for the patient to complete, or unsuitable for certain patients or patient populations.[10,20,22,68]

In a 2009 study by Jette et al,[68] slightly less than half (48%) of the PTs surveyed reported using STMs.[68] Of these therapists, more than half (52%) of them did not plan to change their practice related to STMs in the future.[68] This is an improvement over findings from studies in the late 90s and early 2000s where rates of STM use by healthcare professionals ranged from 18% to 37%[12] but is still far from ideal. Despite the low utilization of STMs reported in many studies, attitudes toward STMs are predominantly positive.[11,20-22,68,69] In a 2012 study of PTs, 60% of survey respondents perceived completing a STM during examination as very important; however, a similar percentage, 58%, indicated that they felt performing the examination was "very burdensome".[61]

The benefits of STM use have also been found to be common across disciplines and in alignment with the literature on EBP.[8,10,12,71] Standardized tests and measures may facilitate the direction of the plan of care, improve monitoring of patient progress and program effectiveness, and enhance communication with the patient and other healthcare providers.[8,10] In a 2010 survey-based study of healthcare professionals in stroke rehabilitation settings, 85% of respondents felt outcome measures helped demonstrate the effectiveness of rehabilitation.[8,10] Additional benefits to using STMs include identifying patients "at risk for poor or adverse outcomes, facilitating improved continuity of care for patients transitioning from one health setting to another, determining the most cost-effective settings for patients to receive rehabilitation services, assessing practitioner and organizational performance and determining the most effective interventions for particular conditions."[68(p126)]

The clinical setting in which a physical therapist practices affects the likelihood of using STMs, regardless of individual factors.[68] In one study, physical therapists working in outpatient settings were 12 times more likely to use standardized outcome measures than their home health counterparts and seven times more likely than acute care therapists.[68] Individual factors that have been found to positively contribute to the routine use of outcome measures are in parallel with the EBP literature. Higher degree attainment and fewer years in clinical practice are statistically significant factors supportive of an increased use of outcome measures amongst physical therapists in the U.S.[11] Physical therapists with American Board of Physical Therapy Specialties (ABPTS) certification were twice as likely to use standardized outcome measures than those who did not hold a specialty certification.[68] Given the timing of the Sicily statement, the APTA Vision 2020 statement, and CAPTE accreditation standards for academic programs, this would appear to indicate that some of the barriers to EBP and STMs would resolve as more doctorally-trained PTs enter the workforce. In actuality, the trends in EBP and STM behaviors indicate that these supportive individual factors decline over time and may be outweighed if negative organizational and extra-organizational barriers present.[59,60,68]

Clinical Education and Evidence-based Practice

Physical therapist students spend time learning in both academic and clinical environments. Given the "hands on" nature of the profession, practical learning experiences in real clinical settings are a necessary and important part of the professional preparation for practice. This practical learning occurs under the guidance of licensed PTs, known as CIs. Clinical instructors are important role models during clinical education and are "more likely to change student EBP skill than classroom

instruction."[34(p2),72] With approximately 1/3 of the time in an entry level PT program devoted to clinical education, these CIs have the potential to strongly influence the growth and development of these students into clinicians.[26,72,73] Although the literature supports that effective CIs enhance student learning and ineffective CIs may inhibit student learning, there are few actual curricular requirements and criteria for serving as a CI.[73,74] The CAPTE requires CIs to be licensed PTs with a minimum of one year of clinical experience and to be "effective" in their clinical teaching, although this is not explicitly defined.[4] Additional recommendations are just that – recommendations – with no binding requirement that CIs complete the APTA Credentialed Clinical Instructor Program or meet other recommendations beyond their willingness to serve as a CI in a largely volunteer-based clinical education system.[73] Measuring the effectiveness of these individual clinical experiences and mentoring the many individuals involved in clinical education is difficult for physical therapist education programs; balancing the CI role with the many responsibilities of clinical practice is also challenging for physical therapists.

Clinical learning is impacted by factors beyond just CIs providing guidance to students through the application of clinical reasoning, theory, psychomotor skills and professional behaviors with "real" patients. The interpersonal relationship between student and clinical instructor and the culture of the clinical environment also affects the quality of learning during clinical education experiences.[73,75] PT programs are not always successful in meeting the unique individualized needs of these clinical partners, both CIs and PT students, nor ensuring consistency across clinical education experiences for PT students.[26,34,35]

Physical therapy students often report discord between what they learn in the academic environment and what they experience in clinical practice. Dutton and Sellheim[29] explored this "academic-clinical dissonance" between the classroom and clinic in a 2014 qualitative study of physical therapist students.[29] Dissonance themes that emerged were in the areas of patient examination, application of evidence-based practice, productivity, reimbursement, and documentation.[29] Meyer et al[40] found this incongruence between the "academic ideal and clinical reality" to be present in nursing students as well. Students enter CEs expecting confirmation of what they have learned about clinical practice, yet often find variability in clinical practice that is discordant with their academic preparation.[40] The common response to dissonance between the academic and clinical worlds is often frustration and stress, typically leading to student inaction and deference to clinical practice.[29,30,40]

Academic and clinical partners in entry level clinical education must be very aware that "What students are taught in class is not necessarily what they learn."[29(p50)] Although a number of studies have explored the self-assessed EBP beliefs and knowledge of CIs,[34,76] few have directly measured the impact CIs have on PT student EBP beliefs and values.[17,33,72] A limited body of research indicates that clinical instructors influence the evidence-based practice (EBP) behaviors of physical therapist students.[34,72] In an editorial in The British Medical Journal (BMJ), Del Mar asserts, "Unless students see their role models use EBM in practice, they are unlikely to value it as clinically important."[64] Limited use or negative attitudes toward EBP by clinical instructors may adversely influence students' decisions to follow recommended EBP guidelines as entry level clinicians.[34] As the use of STMs is recognized as a critical element of evidence-

based practice, these findings may be anticipated to correspond to attitudes and behaviors related to STMs as well. Findings from a 2016 systematic review by McCallum et al[73] were inconclusive with conflicting evidence as to the impact demographics and characteristics such as age and CI credentialing of PT CIs had on student clinical experiences.[73] This systematic review involved studies with few of the CI participants holding doctoral degrees, so the impact of CAPTE-required EBP training in entry level DPT curriculum could not be fully explored.[73]

Preparation and expectations for a clinical experience are primarily focused on what the student will achieve through learning from the CI. Clinicians often describe clinical teaching as a means to "give back" to the profession through teaching students but do acknowledge that students can "create a two-way learning interaction"[39(p229)] by bringing academic knowledge into the clinic. Although clinicians report this benefit, the literature provides limited evidence of a direct influence on STM or EBP integration into practice from this two-way learning nor that the EBP behaviors of CIs, as a subset of U.S. PTs, are fundamentally different.[34] In a 2008 study by Sabus et al,[24] 84 PTs, of which 55 were CIs, and 31 DPT students completed surveys evaluating EBP competency and clinical behaviors before and after a student-driven EBP educational project and inservice. The project and inservice were not found to have a statistically meaningful impact on evidence-based clinical behaviors but did improve perception of EBP competency of both students and CIs.[24] No research was identified that specifically explored PT student influence on CI attitudes and behaviors associated with STMs.

Passive methods to increase STM utilization, such as workshops and publication of new STMs and practice recommendations, are largely ineffective.[8] This is consistent

with what has been previously discussed related to the EBP literature. Active educational initiatives, professional support at the organizational level, and position statements by national professional organizations representing the respective health profession, have been reported to influence change behavior in STM use.[8] According to Jette et al,[68]

> "Although the content, properties, and applicability of many standardized outcome measures have been reported in the literature for more than a decade, clinicians continue to report that the measures are not used because they are not applicable to their patients or that they cannot interpret the scores. It appears, therefore, that disseminating information through the professional literature may not be an efficient or effective mechanism. Further instruction and enculturation through continuing education as well as professional and graduate professional education may increase the use of standardized outcome measures."[68(p134)]

Evidence-based Practice and Standardized Test and Measure Adoption or Resistance

Behavioral Change Theories

Behavioral change theories attempt to explain why behaviors change and/or become enculturated. The primary tenet underlying these theories is that change is a complex and continuous reciprocal interaction between cognitive, behavioral, and environmental determinants. Certain behavioral change theories place greater emphasis on the impact of the self over extrinsic factors such as societal norms, with the more intrinsic variables of self-efficacy, self-regulation, and motivation as imperative to successful behavioral change.[44,56,75,77] Numerous theories exist that may explain why some PTs are more likely to embrace STM use in practice or alter behavior to align with professional expectations. The theories that appear to bear the greatest relevance to this topic are social cognitive theory, self-determination theory, as well as experiential adult

learning theories. These situated learning and behavioral change theories will be discussed from the perspectives of physical therapist practice and clinical education. Cognitive dissonance theory will also be applied to the discussion of academic-clinical dissonance experienced by PT students. Organizational behavior and work motivation research are integrated into this discourse, as applicable.

Social cognitive theory and self-efficacy. Albert Bandura is frequently cited as the father of social cognitive theory (SCT). Social cognitive theory is a useful theoretical framework to explain both PT student and established clinician behaviors in the context of EBP and STM use. In social cognitive theory, individual motivation and self-regulation are important elements that explain learning and behavioral modification.[78] Bandura identified five basic human capabilities at the core of SCT: (1) symbolizing, (2) forethought, (3) vicarious learning, (4) self-regulation, and (5) self-reflection.[78,79] In essence, "individual performance is influenced by ability, efficacy, expectations and value"[80(p158)] when viewed through the lens of SCT. Included in the SCT theoretical framework is the concept of perceived self-efficacy as integral to meaningful behavioral change.[78,80] However, individuals are not perceived as spontaneous personal agents, automatically executing desired outcomes, in SCT; individuals are also influenced by environmental factors such as pay for performance in the healthcare payment system and the perception of how successful or unsuccessful one's actions/behaviors might be.[78,79]

Self-efficacy is an individual's belief and confidence in his or her "capacity to execute behaviors necessary to produce specific performance attainments."[44(p561)] General self-efficacy (GSE) captures a broader purview; GSE is an individual's "belief in one's overall competence to effect requisite performance across a wide variety of achievement

situations."[81(p63)] Self-efficacy has a strong positive relationship with work-related performance.[56,81] The concept of personal confidence, or more precisely self-efficacy, plays a pivotal role in SCT.[79] The theoretical perspective of SCT can be directly applied to clinical instructors and PT students. Students with high levels of self-confidence and perceived competence going into the clinical environment are more likely to advocate for and use EBP with their patients, regardless of CI patterns of use.[56] A CI's confidence and perceived competence in EBP, aspects of self-efficacy, are identified as factors that may influence EBP behaviors, perception of value, and self-efficacy in students.[79,82] It can be theorized that students with high levels of self-efficacy and the ability to build strong relationships with their CI may positively influence their CIs' STM use and perception of value by the end of a terminal CE. Students with these characteristics may be more likely to carry these beliefs into their entry-level practice as well.

Professional confidence, which has often been used synonymously with self-efficacy, may be impacted by a variety of factors and in dynamic fashion.[78] This perspective from SCT is consistent with findings from Duncan's[8] systematic review of the health professions; multilevel determinants impact EBP and the use of STMs.[8] According to Stajkovic and Luthans,[79]

> "unless employees believe that they can gather up the necessary behavioral, cognitive, and motivational resources to successfully execute the task in question (whether working on a product/service or developing a strategic plan), they will most likely dwell on the formidable aspects of the required performance, exert insufficient effort, and, as a result, not do well or even fail on the task."[79(p127)]

Self-determination theory. Self-determination theory (SDT) is another broad framework to explain human motivation and personality. In SDT, motivation is at the

center of what we do and how we act.[75] Both positive and negative motivators exist; these motivators may be intrinsic or extrinsically focused.[75,83] Six forms of motivation have been proposed to make up a continuum from amotivation on one end to intrinsically motivated behavior on the other.[56] Extrinsic motivators lie in between these two on the continuum and have been defined in terms of how well internalized the extrinsically motivated activity is. These 4 extrinsic motivators have been referred to as (1) integrated (2) identified (beneficial but not performed for fulfilment), (3) introjected (performed to avoid negative feelings) and (4) externally regulated (behaviors that satisfy a regulatory demand or reward/penalty).[56] Alignment or resolution of conflict between these motivators will likely contribute to optimal action and behavioral change according to SDT.[75] From this theoretical perspective, the reason to engage in behavior is based on attaining psychological well-being, the ultimate reward, with positive motivators more likely to lead to this sense of well-being.[56,83] When in conflict, or negatively oriented extrinsic motivators are perceived as more influential, inaction or non-optimal behaviors may occur,[8,56,77] as has been noted in the literature when students perceive dissonance between the clinical and academic settings.[29,30,40] Research supports that more autonomously motivated behaviors are more stable and actions are performed to higher standards.[56] With the decline in sense of relevance for EBP and EBP behaviors within the first 2 years of clinical practice,[38] one must consider how well integrated or internalized the motivation to be an evidence-based practitioner, using STMs, truly is beyond entry-level preparation and into practice.

Self-determination theory has been applied to work motivation and organizational behavior.[77] Research indicates that an employee's work motivation, individual

psychological needs (i.e. desire to be autonomous, competent, or connected with peers) and workplace factors such as job demands and resources influence not only job satisfaction, but work engagement and performance as well.[77] Dannapfel et al[55] utilized self-determination theory as a basis for explaining Swedish PTs rationale for using research in clinical practice.[55,56] In this qualitative study, reasons for research use were mapped to the six forms of motivation on the SDT continuum.[55] On one end of the spectrum were PTs that were intrinsically motivated, using research for its own sake, feeling a sense of fulfillment and satisfaction from doing so.[55] Others felt research was important in order to stay aligned with the values and needs of others, integrating research use because it is as a necessary part of professional development.[55] Further down the continuum were those that identified research as beneficial as a means for more personally valued goals such as career advancement. Introjected behaviors were noted by some PTs, with reasons such as feeling pressured to use research because it was expected of patients.[55] External regulation of behavior was also common, with managers and insurance companies requiring research use and imposing reward or punishment based on EBP behaviors.[55]

Resistance is a common reaction to innovation and change in health professionals' routine practice.[8] External imposition of behavioral expectations, such as enforced use of STMs, has not been identified as a preferable means to effect lasting behavioral change and may, in fact, inhibit uptake.[8] It has become, however, a reality, a necessity, for organizations to enforce STMs reporting in our current healthcare climate. Duncan et al[8] proposes that,

> "Where external imposition of outcome measures does occur, organisations should consider developing mechanisms to overcome foreseeable barriers such as increasing communication to explain the rationale for compulsive measurement and increased education and training to counter the foreseeable resistance they will meet. Finally, organisations should carefully consider how they deal with sub-standard performance: a punitive approach to poor outcomes is likely to result in decreased measurement, not increased performance. If the organisational and the team levels are supportive of routine outcome measurement in practice, then research in related fields provides good empirical and theoretical reason to believe that the resultant social normative pressure will result in individual clinicians becoming more interested in collecting this data too."[8(p7)]

Experiential/social adult learning theories. Theories of learning in workplace environments are directly relevant to not only PT clinical practice, but also to PT clinical education. According to Patton et al,[31]

> "Being a physiotherapist involves negotiating ways of being and interacting within the physiotherapy community of practice, which includes being identified as a physiotherapist and also identifying with other members of the profession. Physiotherapists also liaise with other healthcare professionals and work as part of a healthcare team. Building and maintaining professional relationships is considered fundamental to good practice and the achievement of optimum client outcomes. This relational model of physiotherapy practice underlines the important contribution of social learning theories to the formation of wise clinical education practices."[31(p494)]

From the perspective of social and situated learning theories, the PT workplace must be realized as the critical but complex learning environment that it truly is. Patton[31] asserts that without a deeper consideration of the multidimensional challenges and unique needs of the healthcare environment when guiding clinical education practices, PT students will not effectively develop the professional practice capabilities needed for the optimal client outcomes described in the previous quote.[31]

Learning in practice provides context and leads to greater integration of behavior than learning in the classroom environment alone- this simple statement underpins the rationale for the clinical education component of the health professions.[31] Opportunities to actively experiment are important. Kolb described this situated learning in practice as a cycle, with concepts "derived from and continuously modified by experience."[84(p37)] If students do not observe or practice tools learned in the academic setting in clinical practice, students may not have the depth of learning and carry over into their own practice. Clinical experiences provide the opportunity for students to interpret the complex interchange between social, contextual and individual experiences as they apply theory to practice.[84] This can have both positive and negative implications; a criticism of social theories of learning is that learners may be molded to patterns of behavior in established workplace practices and, if suboptimal, that is what is learned.[31,84] If the mentor's knowledge and skills or the relationship between the mentor and mentee are not ideal, what is learned may not reflect the professional expectations for contemporary clinical practice. A substantial body of evidence supports the pivotal value social relationships hold in guided workplace learning.[31,84]

Situated learning theories expand beyond the individual relationships between CI and student; through this framework, learning occurs as part of a progressive process of integration into a community of practice. These communities have collective norms and expectations; learners are accepted as they engage in manners consistent with the environmental community they are immersed in.[31,84] Research indicates that this sense of acceptance impacts the quality of learning during clinical placements.[31,84] Unwelcoming or "dissonant" environments, in conflict with student expectations, inhibit learning as

students focus is on gaining acceptance, not learning.[31,84] In a qualitative study by Plack et al,[84] PT students indicated that learning the "culture and norms of the profession" did not come from their academic preparation but from the total immersion into clinical practice that comes from clinical education experiences.[84]

Cognitive Dissonance Theory

Cognitive dissonance theory (CDT) is largely credited to Leon Festinger.[40] According to Festinger's definition of cognitive dissonance theory, there is a tendency for individuals to seek consistency among their cognitions (i.e., beliefs, opinions, attitudes, and behaviors).[40] When there is an inconsistency between these cognitions, known as dissonance, psychological discomfort will occur.[40] The individual, according to CDT, attempts to find equilibrium and return to their preferred state.[30,40] There is a limited body of research exploring cognitive dissonance theory and the implications for health professions students in clinical education but findings across nursing and PT are overwhelmingly consistent.[29,30,40] Academic-clinical dissonance, as previously described in this chapter, occurs when students enter CEs expecting confirmation of what they have learned about clinical practice, yet experience something quite different from their expectations based on academic preparation.[40] PT students reported dissonance themes in Dutton and Selheim's[29] 2014 qualitative study in the areas of patient examination, application of evidence-based practice, productivity, reimbursement, and documentation.[29] The common response to dissonance noted in the nursing and PT literature were aligned with CDT - frustration and stress were noted due to lack of alignment between clinical reality and academic ideal.[29,40] Student responses were typically that of inaction and deference to clinical practice.[30,40]

Inaction and deference to "how things have always been done" can also be applied to clinician behaviors when faced with inconsistencies between imposed organizational and regulatory expectations but inadequate support systems and preparatory education. Price et al[85] applied the theoretical perspective of cognitive dissonance to nursing staff and tolerance for suboptimal care.[85] From review of the literature and confirmed by this study's conclusions, nurses adopted attitudes and behaviors of conformity, accepting suboptimal care to reduce their perception of cognitive dissonance and to feel accepted within their team and community of practice.[85] The research on EBP and STMs related to poor integration of outcome measure utilization may be viewed through the lens of CDT. If practice expectations remain discordant with personal beliefs, opinions, attitudes and behaviors, the same patterns of inaction and deference to existing patterns of STM use may occur.

Gaps in the Literature

Based on the identified research, there are a number of gaps in the physical therapy literature regarding integration of STMs into routine, contemporary clinical practice. These gaps include identification of alliance or conflict between the STMs students learn during their academic preparation and the STMs most commonly utilized in clinical practice, determination of the best instructional methods for EBP and STMs during the professional practice preparation of PT students and into the workplace, and the impact of individual characteristics and organizational and extra-organizational factors on current and future EBP and STM attitudes, behaviors, and confidence.

The first gap is to identify the STMs PT students learn during their academic preparation. Entry-level physical therapist programs must provide instruction in the

selection, implementation, and interpretation of tests and measures from the categories of tests and measures (i.e. aerobic capacity/endurance, balance, gait, motor function) provided in *The Guide to PT Practice*.[1] The CAPTE does not explicitly indicate which tests and measures should be emphasized and leaves much of this to the discretion of each educational program.[4] A number of survey-based studies exist from the past 15 years that have culled information from PTs about their frequency of use, preferred STMs, and related attitudes and behaviors to STM use in practice.[8,10,11,14-16,19-22,61,68,69,86] Wedge[22] specifically identified a need to more closely examine the use of STM by CIs and the exposure students have to STMs during clinical experiences.[22] With the healthcare environment continually changing, a contemporary snapshot from CI *and* PT student perspectives would contribute to the existing literature.

Other gaps in the literature relate to the impact of individual characteristics of PT students and clinical instructors on current and future EBP and STM attitudes, behaviors, confidence, utilization patterns, and best practice for EBP/STM instruction. The literature provides limited evidence of a direct influence on STM use or EBP clinical behavior integration into practice during clinical education.[24,34,40,64,87,88] A limited, and at times, contradictory body of research exists as to the influence demographic characteristics such as age, degree, certifications, years in practice, and respective practice setting have on EBP and STM use amongst PTs.[11,68,72,75] There is a paucity of research exploring individual factors that impact PT students and novice PTs remaining committed to EBP during their early years of clinical practice.[33,62,68]

Organizational and extra-organizational factors have been proposed to potentially negate positive individual factors that contribute to EBP behaviors.[8,33] Although concepts

such as self-efficacy have been proposed to be influential to EBP commitment and some research supports that the level of EBP exposure may influence behaviors, there is little definitive evidence of what will lead to best practice in EBP and STM utilization.[31,56,75,77] Research has not specifically and comprehensively explored factors that influence STM integration into practice from both the perspectives of clinicians as CIs and their PT students after a terminal CE. Students may provide a valuable viewpoint on STM use in the clinic – their perspective is notably scarce in the associated literature.[24,72,87-90] Exploring the attitudes, beliefs, and characteristics of these two group may provide additional insight into not only the influence clinical education experiences may have on STM utilization but also might guide instructional methods across both classroom and clinic.

Much of the literature related to STM attitudes, barriers, and beliefs have been either purely survey-based or solely qualitative in nature. Although both methods can provide valuable information, a mixed method approach provides for a more robust and comprehensive method to address the research questions. Mixed methods approaches triangulate data from multiple sources or through different types of exploration, decreasing the risk for researcher bias.

The knowledge gained from this research may provide a clearer picture of the current state of STM utilization in PT practice. This research may also guide efforts to advance STM use, aid academic programs in establishing EBP and STM instruction priorities, and facilitate the development of best practice teaching strategies for STM education for entry-level practice and beyond.

Summary

The literature leads us to consider carefully the multifactorial and complex interactions that influence STM integration into clinical practice. The approaches taken during professional practice education, especially during clinical education, may have a profound impact on the development of EBP and STM behaviors and values. The application of behavioral change and cognitive dissonance theories may enhance the understanding of this complex topic and provide insight into approaches that may support more universal integration of STMs in contemporary clinical practice. PT student and clinical instructor perspectives may provide a more balanced vantage point to explore this research topic.

CHAPTER 3: METHODOLOGY

Introduction

In this chapter, a thorough description of the research methodology is presented. This study utilized both qualitative and quantitative methods to explore the research questions presented in Chapter One. This mixed method sequential explanatory design combined a survey and individual interview approach. The survey validation process and pilot study are described. Sampling is discussed and includes description of the subject recruitment process, sample size estimation, and sampling method. In the quantitative methods section, the research methods and procedures are presented. The qualitative research section explains the qualitative framework for the one-on-one interviews and the processes for data transformation, coding, interpretation and, ultimately, the integration with results from the quantitative phase of data collection and analysis. Processes for data collection, analyses, and archival from the quantitative and qualitative phases are described.

Research methods

The purpose of this study was to explore factors that influence the use of STMs by CIs and their PT students during a terminal clinical education experience. A mixed methods sequential explanatory design, as defined by Creswell,[36] was employed. Collection and analysis of quantitative data occurred, followed by collection and analysis of qualitative data. The qualitative phase of the study and subsequent results assisted in explaining and interpreting the findings from the quantitative phase (Figure 2).[36]

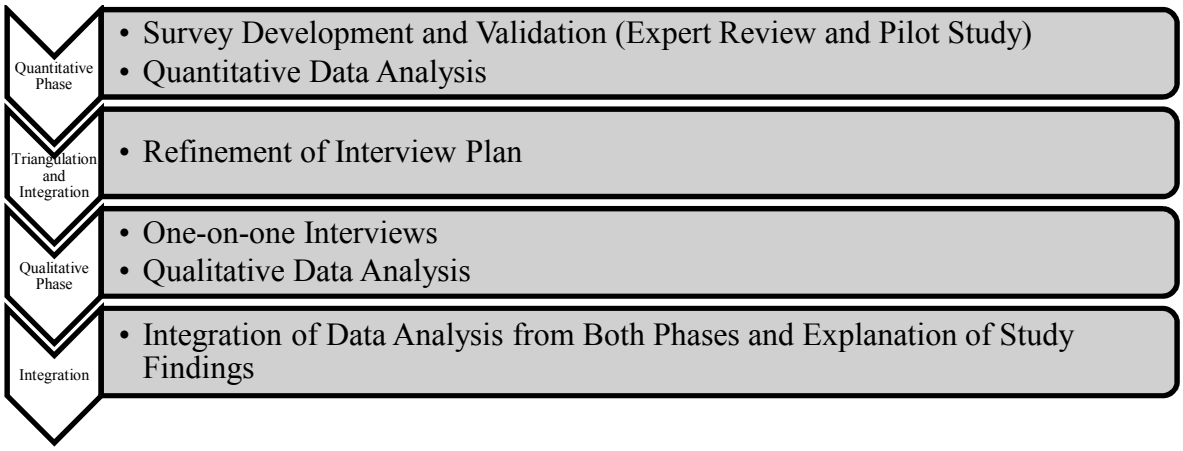


Figure 2. Sequential explanatory mixed methods design

A non-experimental survey design was implemented with two nonrandomized, nonequivalent comparison groups (CI, student) to provide breadth of perspectives on factors that influence STM beliefs and patterns of STM knowledge/use; the subsequent qualitative interviews with a cross-section from each group helped refine and provide a more robust and meaningful answer to the overarching research questions. In the surveys created for each group, variables related to participant demographic characteristics, perceived value, rationale, and use of STMs were explored. The quantitative phase was designed to explore differences between groups and potential correlations that were associated with or predictive of patterns of STM use and value. The procedural steps of the research study were the same for each group with electronic survey wording and interview questions modified to reflect group membership only.

In qualitative research, hermeneutic phenomenological theory and its corresponding research method allow for exploration of the essence of an experience. Phenomenology offers a "descriptive, reflective, interpretative, and engaged mode of inquiry"[91(p67)] into an individual's views and perspectives on their lived experience within

the context of each individual's relationship with people, events, things and situations.[91] Hermeneutic phenomenology is based on the work of Martin Heidegger, a disciple of Husserl.[91] According to Kafle,[92] the hermeneutic phenomenological approach strives to "get beneath the subjective experience and find the genuine objective nature of the things as realized by an individual. Hermeneutic phenomenology is focused on subjective experience of individuals and groups. It is an attempt to unveil the world as experienced by the subject through their life world stories."[92(p186-187)]

The phenomenological approach is well suited to describe a phenomenon as it is lived and experienced from the point of view of the person involved. In this research study, this point of view will be from the perspective of CIs and PT students. The theoretical aim is to gain a deeper understanding and, from individual descriptions and individual narratives, identify commonalities and differences.[91] A phenomenological approach for the qualitative component of this research allowed for exploration of subtleties and complexities about the participants that might be missed through the quantitative methods employed.[93] Although findings cannot be generalized to a larger population, the findings can be transferrable and applicable to others with similar experiences.[94]

IRB Approval: The Institutional Review Boards (IRB) from Nova Southeastern University and Clarkson University reviewed and approved the research protocol prior to recruitment of participants or survey validation processes.

Quantitative Research Design

Participants. Study participants were (1) PT students from accredited physical therapy programs in the United States that had completed their didactic preparation and

were on a terminal clinical education experience, and (2) their respective CIs. A terminal CE was defined as a CE that takes place after all didactic content in the curriculum has occurred. The CI participants were licensed PTs in the United States with at least one year of clinical experience in their respective practice setting. All study participants were required to attest that they were 18 years of age or older and provide informed consent. Individuals who previously participated in the survey or interview process during a prior terminal clinical education experience during the data collection period were exempt from participation; this was a distinct possibility as many PT programs have more than one terminal clinical education experience and some CIs host numerous PT students.

Instruments. The factors that influence the use of STMs, based on the literature and theoretical perspectives presented in Chapter Two, are complex and multifaceted. A simple initial conceptual framework was considered in the development of the survey instruments. The initial conceptual framework considers both intrinsic and extrinsic factors as potential influences on attitudes and behaviors related to STMs. Intrinsic factors that potentially influence STMs for CIs are factors balanced between professional identity and internal motivators such as: (1) experiences as a student and the role of mentor(s), (2) clinical practice experience/knowledge, (3) formal education (i.e. terminal degree, board certification, residency, APTA CI credentialing course), (4) experience as a CI, and (5) factors such as self-efficacy, confidence, autonomy, and interpersonal skills. Although PT students' use, attitudes, and behaviors related to STMs have not been explicitly explored in the literature, concepts based on the influence of the CI and PT student relationship and the broader framework of evidence-based practice have been presented. Factors that appear to influence STMs for students are (1) role of mentors, (2)

personal factors that mirror that of CIs, (i.e. self-efficacy, confidence, autonomy, interpersonal skills). Extrinsic factors that appear to be relevant to PTs, based on the literature, are: (1) the ready availability of resources and tools, (2) ongoing training and support, (3), community of practice expectations, and (4) regulation and reimbursement.

From a review of the literature, surveys that addressed similar research questions were identified.[14,68,95] The survey instruments (Appendices 1 and 2) used in this study were developed for this research project considering the appropriateness of inclusion or adaptation of questions from the literature review. Any questions or elements of previously published surveys will be referenced, as appropriate, in all future publications.

The primary constructs intended to be measured by the surveys were operationally defined in Chapter One and were further analyzed during the survey validation process, described in more detail later in this chapter, through expert review, piloting of the surveys, and evaluation of internal consistency of items anticipated to measure the identified constructs.

The first section of the survey for CIs encompassed participant demographics, perceived value of STMs, and if their use or value changed based on their current student's clinical experience. CIs were asked to provide information about their rationale for STMs use; this rationale encompassed both how they use these STMs (i.e. to screen, diagnose, measure change, drive clinical decision making), and why or why not (i.e. sound psychometric properties, facility expectation, or reimbursement requirement). The survey also contained a section for participants to indicate how strongly they agreed or disagreed with statements related to commonly reported strengths and weaknesses of STMs, as identified from previous literature.[68] The demographic data collected from CIs

encompassed: (1) professional entry level physical therapy degree, (2) highest earned degree, (3) years in clinical practice, (4) preferred gender identity, (5) race, (6) ethnicity, (7) APTA membership, (8) ABPTS Certification, (9) primary clinical practice setting, (10) years in current clinical practice setting, (11) primary clinical focus area, (12) geographic location, and (13) the number of PT students supervised in the past two years.

The first section of the survey for PT students encompassed participant demographics and ratings of confidence in selecting, administering, and interpreting STMs prior to their clinical experience and at the time of survey completion. Students were queried to reflect on the value associated with STMs to the profession, to the clinic they completed their CE, and how their value changed from before their clinical experience to how they felt at the time of survey completion. Student demographic data encompassed: (1) preferred gender identity, (2) race, (3) ethnicity, (4) clinical practice setting, (5) geographic location for the current CE, (6) primary clinical focus area, (7) length of CE, and (8) current academic grade point average (GPA).

In the second section of both surveys, the groups were provided with a STM list compiled from the categories indicated in the CAPTE Standards,[4] commonly identified from Medicare functional limit reporting,[96] from the APTA Research Section's Evaluation Database to Guide Effectiveness (EDGE) Taskforce,[3] and individual APTA Practice Section[97] recommendations. The STMs presented to both CIs and students were categorized into the following general practice area or population categories: (1) acute care, (2) cardiovascular and pulmonary, (3) geriatrics and home health, (4) hand rehabilitation, (5) orthopedic/musculoskeletal, (6) neurological, (7) oncology, (8) pediatrics, and (9) women's health. Students indicated the STMs they learned in their

academic preparation or during a CE across all categories and if they used the STM during a clinical experience based on each category. Students were instructed to leave blank any row associated with a STM they did not learn at all.

CIs were provided the same STM list as the PT students but had the option to skip categories not relevant to their current clinical practice. CIs indicated which STM they do not use, use rarely, use occasionally, use routinely, and if they learned the test from a student.

Although the CI-student relationship and self-efficacy are, theoretically, potential contributors to behaviors and attitudes related to STM integration in practice, these factors were not directly targeted in the quantitative phase of data collection and only explored after a more open-ended approach in the qualitative phase. This reduced the likelihood of introducing personal researcher biases and beliefs that might influence participant responses.

Survey Validation. Two methods to enhance the quality of questions utilized in survey methodology are expert reviews and field pretests, also known as pilot studies. According to Groves et al,[98] expert reviews are a recommended means to assess whether the questions created for the survey meet content, cognitive and usability standards.[98] In an expert review, subject matter experts review the questions to assess whether their design or content is appropriate based on these core standards. The content, cognitive and usability standards address how well the questions meet the intended research purpose, how consistently the respondents understand the questions and how easily the questionnaire can be completed.[98] Items drafted for the surveys utilized in this research study were sent to a panel of three experts to assess face and content validity. These

experts were Dr. Tawna Wilkinson (AT Still University), Dr. Carol Recker-Hughes (SUNY Upstate Medical University), and Dr. Nicki Silberman (Hunter College). Selection of these experts was based on their respective expertise in survey methodology, clinical education, and/or STM research.

The expert panel was sent a copy of the approved idea paper for this dissertation research project and encouraged to attend specifically to the purpose of the study and related research questions to be addressed. SurveyMonkey®, an online survey development cloud-based software, was utilized by the primary investigator as the mode for distribution of these surveys. An expert review rubric (Appendix 3) was sent via email to the expert panel along with electronic Survey Monkey® preview links to access the draft versions of the two surveys. The panel was asked to determine if the survey items met the content, cognitive, and usability standards outlined in the rubric and encouraged to provide feedback or concerns as comments into the rubric or directly through the survey preview mode in Survey Monkey®.

The expert panel rubric was divided into sections, with the first section based on criteria related to clarity, wordiness, negative wording, overlapping responses, balance, use of jargon, appropriateness of responses listed, use of technical language, application to praxis, and relationship to the research problem. The second section of the expert panel rubric specifically requested that the experts determine if the survey adequately measured key constructs defined in Chapter One: (1) perceived value of STM, (2) attitudes and behaviors related to STM, (3) participant demographic characteristics, and (4) confidence. Each item in the rubric was rated on a four-point scale: One= not acceptable, Two=below expectations, Three=meets expectations, and Four=exceeds expectations.

Only one reviewer (NS) fully completed the expert review rubric for each survey. The other two experts did not fill out the rubrics but did indicate through email communication that all items from the rubric met expectations (a rating of at least three). All three reviewers provided specific and detailed recommendations for improvement to the surveys, with a focus on enhancing clarity in instructions and optimal wording of questions. Recommendations were compiled into an Excel® spreadsheet for ease of readability and clustering of comments to be addressed by question or section. The expert panel was sent the compiled Excel® document with the researcher's responses and planned edits based on their collective feedback to the survey drafts. Consensus from this process was achieved upon the second round of review of the planned edits. The experts were sent preview links to the revised surveys for final approval.

Field pretests, also known as pilot studies, were also conducted to validate the survey prior to research participant distribution.[98] Upon approval of the two surveys by the expert panel, surveys were sent to a small group of recently graduated PT students from Clarkson University and the CIs that worked with these students in the Spring of 2017. These pilot surveys served as field pretests. Approximately 10% of the total population to be studied in the dissertation project were solicited to participate in the field pretests; this number was calculated to be approximately 12 PT students and 12 CIs with 14 CIs and 10 PT students actually completing the pilot survey. Participants were encouraged to indicate any feedback or concerns from the survey. Participants were asked to consider the following questions (framed more broadly than the questions sent to the expert panel): (1) Will these questions lead to addressing the research purpose proposed for the study?; (2) Are there any additional questions that should be asked?; (3)

Are there any questions that appear outside the scope of this study?; (4) Should any questions be restructured?; and (5) Are there any technical errors in the instrument?

The average time to complete the draft surveys during the pilot phase was calculated through Survey Monkey® and estimated to take 19 minutes. Comments from the pilot study participants were added to the compiled Excel® document and considered for additional improvement to the surveys and processes.

After the expert panel review and pilot testing, the dissertation committee was provided an overview of the edits made to both surveys through the prior phases of survey modifications. The committee reviewed the revised surveys through updated Survey Monkey® preview links. Feedback from the dissertation committee was incorporated in the final round of survey edits prior to formal study recruitment and data collection.

Modifications to the Survey Instruments. Substantive modifications to the two survey instruments, based on expert panel review, pilot testing, and review by the researcher's dissertation committee, included the following:

A. Both surveys:

    a. The requisite research disclosures (purpose, what to expect, benefits, risk/discomfort, confidentiality of data, informed consent, conflict of interest, and the like) were originally provided in their entirety in both the recruitment email (Appendix 4) and on the first page of the electronic survey. Per expert panel recommendations, the recruitment email remained comprehensive but the electronic survey disclosures were modified to avoid unnecessary

redundancy. A brief purpose statement and section as to what to expect were followed with the following statement, “Informed consent: Please click **I AGREE** in lieu of signature to participate in this study. Informed consent implies that (1) you have received the recruitment email with detailed information and disclosures about this project and (2) you are at least 18 years old.”

b. Survey participants were asked to provide contact information if they were also interested in participating in an interview to share additional information about their experience as a CI or PT student, with a disclaimer regarding the impact to survey anonymity. Participants were informed that survey and interview responses would remain confidential in all publications and presentations and from other research participants. Per expert panel recommendations, this section was moved from page 1 of the survey to the final page of the survey; participants would be better able to determine their willingness to volunteer after having a clearer sense of the research post-survey completion.
c. Consistent use of the full term ‘standardized tests and measures’ was not found throughout the original surveys and was rectified in final versions of both surveys.
d. A few typographical errors were identified in the lists of STMs and corrected.

e. Through discussion with the expert panel, a number of STMs were added to the population/general practice lists provided to survey participants. A disclaimer was added to this section of the surveys that, although comprehensive to commonly used or recommended STMs, the lists are not exhaustive. An "other" box is provided in each section for participants to indicate any STMs not provided.

B. CI survey:

a. Order of demographic questions were modified to lead in with items specific to practice (e.g. professional entry level degree, highest earned degree, years in practice) prior to personal demographic items (e.g. preferred gender identity, ethnic origin, and race), per expert panel recommendation.

b. Original versions of the survey asked for years in practice, years in clinical practice setting, and number of students supervised in the past two years by category (e.g. less than two years, three to five years). Per dissertation committee recommendations, predefined categories as answer options were eliminated and an open text option was provided instead; this allows for coding later into groups if need be without limiting statistical analysis due to pre-distribution grouping options.

c. A number of questions in section one sought a five-item Likert scale response from participants on scales related to level of agreement to statements provided. In the original iterations of the

survey, a neutral response was provided. This option was eliminated for many of the questions so that participants were required to commit more positively or negatively to the statements. For attitudinal questions, the neutral or undecided midpoint of a scale may essentially be considered a "non-answer" as the respondent does not need to take a stance in one direction or the other.[99] By providing varying degrees of agreement, the participant, although required to provide a directional response, was still able to temper that response based on adjectives that define the category, e.g. "agree somewhat" versus "agree completely."[99]

d. Version one of the survey provided only two response options for participants as they reviewed each category of STMs: "use" or "use and learned from a student" or a nonresponse option indicating they were unfamiliar with the item. Based on expert panel discussion, it was deemed valuable to cull more detailed information related to use behaviors from participants. Response options were changed to encompass "do not use", "use rarely", "use occasionally", "use routinely", and "I learned this test from a student", carrying forward the nonresponse option indicating they were unfamiliar with the item in that row. Participants were instructed to scan the lists of STMs and indicate their frequency of use and, if learned from a student, check that box as well.

Instructions preceding the STMs presented for each general practice area or population category were edited for clarity.

C. PT Student survey:

   a. In version one of the survey, confidence related to both administration and interpretation of tests and measures was combined into one question. Per the recommendation of the expert panel, these were separated out into distinct questions as confidence for administration and interpretation cannot be assumed to be the same and combining these may limit understanding of the response. In the final version of the survey, confidence with selection, confidence with administration, and confidence with interpretation are all explored independently.

   b. Version one of the survey provided the following response options for participants as they reviewed each category of STMs: “learned in prior academic coursework” or “learned during a prior clinical experience”, “learned during this clinical experience”, and a nonresponse option which would indicate they were unfamiliar/did not learn the STM at all. After discussion with the expert panel, the responses were changed to “learned in prior academic coursework”, “learned and used during a prior clinical experience”, “learned and used during this clinical experience”, and the nonresponse option, in an attempt to better understand not just the learning environment but use indicators. Some participants in the

pilot study felt the original options and instructions were confusing; after further review, the final version addressed this with the following revisions: “learned in prior academic coursework”, “learned during a clinical experience’” “used during a clinical experience for this setting/population”, and the non-response option. Instructions preceding the STMs presented for each general practice area or population category were edited for clarity, thoroughly explaining the revised response options and providing an example. In the final version, participants could respond to the learning environment by checking the corresponding box and check the “used during a clinical experience for this setting/population” as well, if appropriate.

Pilot Study. Responses from the pilot study were entered into an Excel® spreadsheet and uploaded to IBM SPSS Statistics Package, version 24. The data was thoroughly reviewed for data entry errors, missing data, and participant feedback in comment sections that informed additional revisions, as previously described.

Internal consistency/scale reliability of items in a survey anticipated to measure the same construct is commonly assessed with Cronbach’s coefficient alpha (CA), a measure of internal consistency.[100] Internal consistency refers to the general agreement between a set of items measuring the same variable, or construct, in a survey instrument.[100,101] The first half of the surveys presented constructs that were intentionally quite broad and exploratory with a known potential, supported by the literature, for influencing/confounding factors that may impact internal consistency.[8] The second half

of the surveys was intended to collect primarily descriptive data related to use of, or education in, specific STMs and, therefore, not appropriate for assessment of internal consistency.

Items representing broad constructs are more likely to be heterogeneous, leading to internal validity that is less than optimal.[102] With the time to complete the surveys during the pilot test estimated to be 19 minutes, adding additional items to the instrument to address each construct more thoroughly would likely also reduce the response rate. With the ability to perform an in depth and rich exploration of the findings from the quantitative phase during the interviews in phase two, good to excellent internal consistency of items in the survey was not a prerequisite to survey distribution.

Additionally, sample sizes less than 30 may be too small to be an adequate representation of the test population when assessing internal consistency with Cronbach's coefficient alpha.[102,103] Although 10% of the projected sample size is an acceptable standard for a pilot study,[104-106] with only 14 CI and 10 PT student responses it is likely that an estimate of internal consistency will be imprecise. A prelaunch internal consistency review of the pilot data was performed, however, to get a sense of any major divergences in responses for the questions intended to measure the main constructs in the CI survey of attitudes and behaviors related to STM use (Q18, Q20), value (Q21, Q22), and PT student influence on STMs (Q24-26). For the PT student pilot surveys, the main constructs of confidence prior to the experience in STMs (Q11, Q13, and Q15) and value (Q17-19) were evaluated.

Reliability Analyses. Responses from the two surveys distributed during the pilot study were assessed with IBM SPSS Statistics Package, version 24. The data was

thoroughly reviewed for data entry errors, missing data, and consistency of responses. All categorical and ordinal responses were coded, with reverse coding completed for negatively phrased questions.

An analysis of pilot data for internal consistency revealed a high level of internal consistency, Cronbach's alpha of 0.79, in the CI survey for the construct of Attitudes and Behaviors: Rationale for Use (Q18). Based on the item-total statistics (Appendix 5), removal of nine of the 11 sub-items from Q18 would have resulted in a lower Cronbach's alpha. A slight improvement only in Cronbach's alpha was noted if Q18b and Q18k were removed, with low corrected item total correlations (-0.19 and 0.29, respectively). These items did not merit removal prior to the finalized survey distribution.

From the construct of Attitudes and Behaviors: Attitudes, item consistency for the 13 items evaluating CI perceptions regarding the strengths and weaknesses of STMs (Q20) was poor at a Cronbach's alpha of 0.40 and 0.34 based on standardized items. Based on the item-total statistics (Appendix 5), removal of five of the 13 sub-items from Q20 would have resulted in a lower Cronbach's alpha. A slight improvement only was noted in Cronbach's alpha when Q20a,d,e,i,l were deleted, with low corrected item total correlations (-0.54,-0.37, 0.05, -0.03,-0.02, respectively). The Attitudes construct is, admittedly, quite broad and is anticipated to be influenced or confounded by a complex mix of intrinsic, organizational and extra-organizational factors.[8] It was determined that the poor internal consistency ratings for these items did not warrant removal. Because the intent of the first phase of this mixed method research is primarily exploratory with the second phase allowing for deeper explanation of findings from phase one, poor internal consistency for this construct was deemed acceptable.

A potential consideration impacting these aforementioned constructs is whether the item reflected an extrinsically driven versus more intrinsically driven influence. A number of items clustered on extrinsically driven reasons for using STMs (i.e. mandated/required for all patients/conditions, mandated/required for patients/clients with certain types of conditions, a facility expectation, or reimbursement requirement). When these extrinsically focused items were considered separately from the other items in Q18 and Q19, a high Cronbach's alpha of 0.89 was identified.

The CI pilot study data was evaluated for internal consistency for value of STMs (Q21: to profession, Q22: to clinic). It had an acceptable Cronbach's alpha of 0.61 and 0.69 for standardized items.

The final construct evaluated for the CI pilot survey was PT student influence on STM attitudes and behaviors (Q24-26), with a Cronbach's alpha of 0.49, and a Cronbach's alpha based on standardized items of 0.60. Based on the Item-total statistics (Appendix 5), removal of Q24 and Q26 would result in a lower Cronbach's alpha. A slight improvement only was noted in Cronbach's alpha if Q25 was deleted with low corrected item total correlations (-0.24). As noted with the construct of attitudes and behaviors, each of the items related to PT student influence on STM attitudes and behaviors may be confounded/influenced by other factors and were thoroughly explored during the qualitative phase of the study.

For the PT student pilot surveys, the main construct of confidence prior to the experience in STMs (Q11, Q13, and Q15) was evaluated and a good Cronbach's alpha of 0.83 was found. Based on the item-total statistics (Appendix 5), no significant improvement would be noted with item deletion.

For the construct of value (Q17, Q18, and Q19), an acceptable Cronbach's alpha of 0.71 was found. (Appendix 5) If Q19 related to personal value were removed, internal consistency would improve to 0.89; however, the construct of value for students is also anticipated to be complex, requiring qualitative exploration to more fully understand the quantitative results.

The expert panel review and feedback from pilot study/field test participants established face and content validity, with the prelaunch item consistency providing additional support, that the surveys were acceptable for distribution.

Recruitment and Sampling. The participants for this study, previously described, were recruited primarily through the Directors of Clinical Education (DCE) from accredited DPT programs within the New York-New Jersey Clinical Education Consortium (NYNJCEC). The DCEs from two other programs, one from Pennsylvania and one from Arizona, were also recruited. As an active member of the NYNJCEC, the primary investigator had direct access to communicate with these DCES to seek their assistance in soliciting/recruiting potential study participants. Thirteen DCEs agreed to participate in survey recruitment processes. These DCEs, in turn, had access to the potential research participants' contact information. The DCEs communicated the research study request and survey links, via email, to PT students and CIs on terminal clinical education experiences (Appendix 4). The primary investigator did not directly solicit/recruit for participants over the internet nor have access to the potential participants' contact information.

The primary investigator provided each DCE with a series of identifier codes for their PT students, with each program identified by a letter that preceded a number

corresponding to the number of PT students reported in the cohort on a terminal CE. In the PT student recruitment request (Appendix 4), these DCEs were asked to attribute PT student names to the codes provided within the body of the PT student recruitment email. Potential PT student participants were provided a link to the PT student survey in the recruitment email and instructed to enter their unique identifier into the survey when prompted. The DCEs did not know if the PT student participants completed the survey and did not have access to the individual responses of these surveys. By the DCEs distributing the recruitment email with the identifier codes to their PT students, the primary investigator did not have access to participants' names, email addresses, or other personally identifying information.

The DCEs were provided a separate recruitment email (Appendix 4) for distribution to the CIs working with PT students from their program on a terminal CE. In this email, a survey link unique to the CI survey was provided. CIs were encouraged to enter their PT student's identifier code into their survey; PT students had been instructed that sharing their code with their CI would allow the researcher to anonymously link the responses from their survey to that of their CI while maintaining the confidentiality of both parties. Participants were assured that their clinical partner and their DCE would not have access to their survey responses. Participants were notified that they could proceed with survey completion without entering the assigned code if they preferred, which would still allow for data analysis related to between-group differences. Paired CI/student survey responses were encouraged as this allowed for analysis anticipated to elucidate aspects of these unique relationships.

The SurveyMonkey® electronic survey recruitment requests were sent by the participating DCEs three weeks prior to the end of their program's terminal CE, with a reminder prompt sent approximately one week prior to the end of the CE. When the reminder prompt was disseminated, the DCEs were asked to destroy all documentation related to the identifier codes that were provided in the recruitment emails.

Completion of the electronic survey did not presume proof of informed consent. Participants were required to indicate their informed consent and that they were18 years of age or older before beginning the survey. As this project entailed (1) minimal risk to participants, and (2) signatures were impractical for the online survey research phase of this project, a waiver of the requirement for signatures on the survey-related informed consent documents was requested and subsequently granted from the Clarkson University and Nova Southeastern University Institutional Review Boards.

Participants, both CIs and PT students, were informed in the recruitment email about efforts made to maintain their confidentiality and related rights. Participants were informed that participation in this research was voluntary. By completing the survey, participants acknowledged that they had read the information and agreed to participate in the research, with the knowledge that they were free to withdraw participation at any time without penalty. The possible risks or discomforts of the study were minimal and this was also noted in the recruitment email. Potential participants were informed that they could skip questions they were uncomfortable with while taking the survey or that they could withdraw from the survey all together. Participants were notified that they may receive a copy of published research from this project at their request and may contact the primary investigator if they had any questions related to their participation in this research.

A potential benefit of participating was provided to participants, indicating that they may become aware of individual perceptions and behaviors associated with using STMs in clinical practice. The knowledge gained from this study may provide a clearer picture of the current state of STM utilization in PT practice, guide efforts to advance STM use, and aid academic programs in establishing priorities and teaching strategies for STM education for entry-level practice.

Participants in the electronic survey were asked to indicate if they were willing to participate in a subsequent interview related to the research subject matter. Individuals interested were instructed to provide their contact information at the end of the survey so the primary researcher could reach out to them to schedule an interview at a time, date, and location convenient to them that provided the opportunity for the participant to speak openly without being overheard by others. Participants were made aware that if their individual choice was to have the interview completed in a public place, there would be potential impact on the confidentiality of the interview process. Participants were notified that by providing their contact information, survey responses to their survey may no longer be anonymous to the researcher; however, no names or identifying information would be included in any publications or presentations based on these data, and participant responses to the survey will remain confidential. This was communicated to potential participants in their informed consent for both the survey and interview. (Appendix 6) To further enhance participant confidentiality, the dissertation committee received access to de-identified aggregate data only.

As incentive for participation in the survey research, participants were entered into a drawing for 20 $25-giftcards from Amazon.com; this is noted in

consent/recruitment emails. A unique web-link to enter the drawing was provided at the end of the survey, allowing those that wished to be entered into the drawing the opportunity to do so while protecting the confidentiality of their survey responses. Despite purposive sampling to a very specific population anticipated to find the survey topic salient, the surveys were time-consuming. From a review of the literature, Singer and Bossarte[107] found that modest monetary incentives may improve survey response rates and completion– "motivating those already predisposed to respond."[107p412]

All participants were offered the contact information of the Chair of the respective IRBs for human subjects' research as well as that of the primary investigator. If participants had questions about their rights as a research subject or if they wished to report any harm, injury, risk or other concern, they were encouraged to contact these individuals.

Sample size and sampling procedures. Some of the previous studies in the U.S. related to STM use have surveyed APTA members only,[61,68] which accounts for approximately 30 percent of PTs in the U.S.[108] These individuals may not be representative of all PTs in practice. Although clinicians that partner with educational programs to provide clinical education may be different than their counterparts that do not, these clinicians should represent a relatively heterogeneous mix of PTs.

According to the CAPTE's Aggregate Program Data: 2014-15 Physical Therapist Education Programs Fact Sheets,[25] 8513 degrees were conferred in 2014.[25] This number is the population size (N) for PT students at this educational level, nearing graduation. There were 272, 906 licensed PTs in the United States as of December 31, 2015;[109] however the actual number of PTs that serve as clinical instructors is unknown. Sample

size estimation with G*Power version 3.1.9.2 was run based on anticipated nonparametric statistical analyses. With an alpha level set at .05 and an estimated medium effect size per Cohen of d=.5, sample size estimation based on a Mann Whitney U test for two group comparison was 67 individuals per group in order to reach the desired power of .8; estimating an effect size is required when an observed effect size is not available in the literature.[110]

The association between the predominantly ordinal and nominal variables had been conservatively anticipated to be evaluated with Spearman rank and chi square, respectively. Logistic regression or discriminant function analysis were also deemed potentially appropriate to explore factors that may be predictive of a categorical/nominal outcome; in this case, high or low STM use, high or low levels of value for STMs, or change in use of STMs attributed to the clinical experience. Principal component analysis (PCA) was theorized as potentially appropriate and would be attempted if the sample size attained was adequate and data was robust. According to Portney et al,[100] "Factor analysis can be used to answer many types of research questions. As an exploratory approach, it can be used to sort through a large number of variables in an effort to reveal patterns of relationships that were not obvious before. This type of analysis may represent early stages of inquiry, when concepts and relationships are not yet sufficiently understood to propose relevant hypotheses." [100(p713)]

According to Van Voorhis and Morgan,[111] there are a number of potential approaches to calculation of sample size for analyses to examine relationships.[111] One general rule of thumb is to have "no less than 50 participants for correlation or regression with the number increasing with larger numbers of independent variables (IVs)."[111(p48)]

The equation N>50+8m (where m is the number of IVs for testing the multiple correlation) is recommended.[111] In another approach, it is recommended that with regression equations using six or more predictors, which this study may potentially have, a minimum of 10 participants per predictor variable is required.[110,111] Based on an assumption that all 12 CI demographic variables proposed for the survey may be included in a regression model, the sample size for CIs should be in the range of 120-146 participants. Based on an assumption that all six PT student demographic variables proposed for the survey may be included in a regression model, the sample size for students should be in the range of 60-98 participants. Given the potential implications of the proposed statistical analyses, a minimum of 120 CIs and a roughly corresponding number of students were considered the ideal number to participate in the study. A conservative sample size estimation, based on nonparametric tests, allows for an adequate sample size if data is not normally distributed. A total sample of 240 individuals, equally distributed across groups, was deemed the ideal sample size. With an anticipated internal electronic web-based survey return rate of approximately 40%, 600 individuals paired in CI/student teams should receive the recruitment email for participation in the study. According to Nulty,[70] internal surveys will generally receive a 30 to 40% response rate; this purposively selected PT student/CI pool are more likely to respond as an internal audience.[70]

Quantitative data analysis. All data from the surveys was downloaded from SurveyMonkey® and entered into SPSS Statistical Software, version 25, for statistical analysis. Descriptive summary statistics were calculated for participant demographic characteristics and the STMs learned by the students and used by the CIs; medians and

interquartile ranges (IQR) are reported as measures of central tendency and dispersion. Frequency distributions were provided as a representation of the pattern of responses. Valid percent is reported; the valid percent is the percent when missing data is excluded. Data from participants were categorized into groups (CI, student) and, when applicable, pairs (CI/student partners that worked together on the terminal clinical experience). Comparison of groups (CI, student) were conducted to examine the relationships between STM use/knowledge, rationale for use, and value. Study variables were ratio, ordinal, or nominal/categorical in nature. When the data was robust to violations of assumptions, parametric analyses were performed; otherwise, the more appropriate conservative nonparametric alternative was used.

Data visualization of frequency distributions helped inform statistical tests for significance. These were useful for the deltas created for confidence change in the PT student data set and for review of other pseudo-continuous variables. For all the statistical analyses, statistical significance was set at .05 α level and .2 β level with a corresponding power of 80%, conservatively reasonable to protect against type II error.[100] Some of the higher order ordinal and ratio level variables were collapsed into categories to simplify interpretation during the analysis.[100] T-tests were used to determine the statistical significance of differences between groupings found in the data visualizations; Levene's test for equality variance was performed. When there were more than two categories in the group, a one-way ANOVA was used to test them simultaneously. A post hoc test, Tukey's Honestly Significant Difference (HSD), was used to test which pairs were different from each other.

The ordinal nature and non-normal distribution of the data influences the selection of statistical analyses. Wilcoxon signed-ranks tests were utilized to compare the confidence in STM selection, administration and interpretation reported by students from prior to the CE to their confidence level near the end of the CE.

A Principal Components Analysis (PCA) was utilized to convert the data collected in Q18 and Q20 of the CI survey into a more useful and interpretable format for analysis. For reducing the dimensionality of data, regression classifiers and PCA are both commonly used and supported techniques.[112] When dealing with categorical survey data with many related questions, PCA is a more directly applicable technique for investigating relationships between survey factors and other data, such as demographic variables. It was anticipated and confirmed during survey validation that certain sub-items in Q18 and Q20 would be linearly correlated; this analysis allowed for clustering of a large number of related variables, reducing them to a smaller number of variables, called factors or components, that were most representative of the Q18 and Q20 item set; the resulting component/factors found were based on strong correlations. After relationships between the variables were established through correlations and prominent factor weighting, regression weighting scores were created for each of the identified factor/components. Identification of each component/factors' abstract meaning was made by a comparative judgement of the weightings. With the score computed for the component/factors, continuous variables were obtained that were representative of those component/factors. These "new" variables were, as a result of the PCA analysis, in a format to allow for additional analyses through *t*-tests, regression, and correlations. Assumptions for the PCA were considered met when: (1) the data was ordinal on the

same four-point scale, (2) a relaxed but consistent linear relationship was found, (3) no outliers were identified, and (4) sufficient sample size was present, i.e. more than five to 10 responses per variable.[112]

Pearson and Spearman's rank correlation coefficients were calculated to investigate association between the variables in this study.[100,113] These correlational analyses allowed for evaluation of the strength and direction of the relationship between these variables.[100,110]

A composite usage summary score for CIs was created. This represented a dichotomous score of '0' for responses related to not using or being unfamiliar with the STM and a '1' for use, regardless of frequency reported. The test and measure scores were summed by category and then across categories the CI responded to. Binary logistic regression with a forward selection process was used to explore the odds for a CI being a STM user versus nonuser, controlling for a number of demographic and survey response variables.

Summary usage statistics and PCA factors were included in the bivariate correlation matrix for the CI data set. The bivariate correlation matrix for the student data set factored in delta scores created based on change in confidence in selection, interpretation and administration of STMs; all other demographic variables and survey responses were included and did not require conversion.

Linear regression was utilized to investigate the factors that were predictive of the most heavily weighted dependent variables created from the PCA.[113] Visual analysis of the residuals were used to confirm normality and homoscedasticity, verifying

assumptions for linear regression.[110] Tests for autocorrelation of predictors were performed using SPSS® collinearity diagnostics to ensure that predictors were not too highly correlated.

Mann-Whitney *U* tests were performed to determine whether relationships existed between the PT student and CI groups on value and frequency of use. A subset of the PT student and CI groups were linked CI- PT student pairings (25 'pairs'). Analysis of these responses was performed to identify if characteristics by CI grouping were associated with responses of positive change in value, attitude, and use in the student. Dichotomous variables based on characteristics from the corresponding clinical partner were formed. For the variables that were not dichotomous, such as the PCA factor scores, a cut point for the grouping was used. Independent *t*-tests were performed when data was sufficiently robust, exploring differences in PT student factors based on CI grouping.

Qualitative Research Design

A subset of participants that completed the survey process and consented for the qualitative phase of this research project were contacted for participation in interviews in the order consents were received (Appendix 6). Survey participation took place during terminal clinical experiences with the subsequent interviews taking place in the summer of 2018, shortly after graduation of the PT student group. A participant recruitment guide outlining the purpose of the qualitative phase of the study, benefits and risks for participation, and contact information of the researcher was emailed to these individuals (Appendix 6). All participants were asked to provide informed consent to participate. As indicated in the interview consent documentation, consent for recording was required for participation in the interview process.

For a phenomenological study, Creswell recommends that an ideal sample size is between five to 25 interviews.[114] A minimum of five, English-speaking, physical therapist students on a terminal clinical education experience were sought and additional participants were solicited until saturation of data was met. Additionally, a minimum of five, English-speaking, clinical instructors were interviewed and additional participants were solicited until saturation of data was met. Eight physical therapist students and nine clinical instructors are represented in this study.

Focus groups are a time-efficient way to gather participant information and may allow for a scaffolding or elaboration of responses among participants that would not be seen in an individual interview.[115] However, the somewhat sensitive nature of sharing information that addresses individual clinician and student alignment with professional practice expectations may be perceived as potentially problematic for a focus group format. Individual interviews "based on prior content-analysis of the matters under examination clearly allow for more intensive elucidation by each person"[115 (p555)] and reduce the likelihood of contamination of individual responses by a desire to align responses with that of others in a group interview or focus group.[115] Although individual and focus group interviews have individual merits and disadvantages, the aforementioned rationale along with the anticipated variability of participant schedules and geographic locales supported an individualized interview approach. Interviews were conducted by phone at a time convenient to the participant. A single interview was conducted with each participant; these interviews were approximately 30 minutes to one hour in length.

The quantitative phase of this mixed method design provided prior content analysis to drive the semi-structured interview framework. Review of the descriptive

statistics from the survey, i.e. the median, interquartile ranges, and frequency distribution to responses, did not indicate that questions from the proposed interview guide required modification prelaunch to address unanticipated findings from phase one of this project.

A Philips PocketMemo digital voice recorder was used to capture the phone interview sessions. Audio recording of the interviews facilitated the researcher's recall of specific and accurate responses. Each interview began with a review of basic participant demographic information and the defined practice setting of the terminal clinical experience. The questions that followed were semi-structured and began as non-directive to encourage discussion on the lived experience of these PT students and CIs. The interview questions eventually drilled down to explore what influences their use and beliefs related to STMs. A series of probes were employed to broaden the extent of the researcher's understanding (Appendices 6 and 7). Semi-structured interviewing is appropriate when the participant has knowledge of the general subject - in this case, having already completed the survey - and the researcher has enough information on the subject to frame main questions or probes that link to prior quantitative data collection and analysis.[91] Although care must be taken to not exclude answers that might not have been exposed in the quantitative data analysis and to allow for detailed and complex answers, this format was likely to be most beneficial given the research design and participant time constraints.[91]

A pilot test of the interview protocols (Appendices 7 and 8) on one participant from each group was performed. Based on the pilot interviews, the order and wording of a few of the protocol questions were revised.

Participants were informed that they had the right to decline to answer any question or to end the interview. Participants were informed that the researcher will not identify them by name in any reports using information obtained from the interview, and that confidentiality as a participant in this study will remain secure. An interviewee may reveal details that, even in absence of their name, may make them identifiable although every effort will be made to ensure confidentiality. Personally identifiable information such as name, email address, and phone number will not be included in research publications and will be destroyed within one year of data collection. The member check process, described in the next section, allows participants additional control over the accuracy of their transcript and their comfort level with inclusion of statements within that transcript. These precautions help reduce the likelihood that individual comments, leading to potentially negative repercussions, may be identified.

As a DCE for an academic program, interviewees may perceive the interviewer as having authority given the nature of this educationally focused research. It was clearly articulated in consent documents that their responses, other than in aggregate, will not be shared with their employer, coworkers, classmates, academic program, or clinical partner. Participants were also informed that there was no penalty associated with refusal to participate partially or in full with the research project and that their individual participation will not be disclosed to those that may, in fact, have real authority over employment or successful completion of clinical education requirements.

Subsequent use of records and data were subject to standard data use policies that protect the anonymity of individuals and institutions. These policies include the provision of adequate safeguards to ensure data is used solely for the specified purpose and can

only be accessed by the identified investigators. All participants were offered the contact information of the Chairs of the respective IRB for human subjects' research as well as that of the primary investigator. If participants had questions about their rights as a research subject or if they wish to report any harm, injury, risk or other concern, they were encouraged to contact these individuals. In the consent for participation in interview research, participants were notified that they may receive a copy of published research from this project at their request and may contact the primary investigator if they have any questions related to their participation in this research.

Qualitative data management. Reflective notes were maintained along with transcription from audio recordings from the interview. Interviews were transcribed and each participant was identified with a pseudonym to protect their identities. Transcripts were uploaded to Atlas.ti® V8, a computer-aided qualitative data analysis software program (CAQDAS), downloaded onto the researcher' personal password-protected computer. All manual and electronic data (i.e. notes made after each interview, original audio files, and electronic transcripts) were maintained under comprehensive security and access controls that include password-protection for computers and electronic hard drives and locked cabinets for archiving of manual and electronic data. Personally identifiable information such as name, email address, and phone number will be destroyed within one year of data collection.

Qualitative methodological rigor. Four constructs are described in the literature to assure methodological rigor in qualitative research. Lincoln and Guba[116] describes the constructs as (1) credibility, (2) transferability or applicability, (3) consistency/replicability, and (4) neutrality/confirmability. As trustworthiness of findings

is critical to the qualitative process, transcribed data from the interviews, impressions from notes made during the phone interviews, and emerging themes as they presented across cases in each group and then across groups were triangulated. Triangulation enhances the transferability of findings from the study. This triangulation guided modification of the initial conceptual framework to best reflect the research outcomes.

Credibility of qualitative research is ascertained through processes designed to ensure the phenomenon of interest represents the reality of the individual interviewed.[116] Interviews were conducted by phone to best accommodate for the geographic scatter, availability, and convenience of participants. Although direct observation of participants was not feasible, audiotaping and transcription of the interviews occurred. Notes were taken to capture the tone and demeanor of the participants and overall impressions immediately after each interview to augment transferability.

Member checking, also known as respondent or participant validation "is used to validate, verify, or assess the trustworthiness of qualitative results."[117] Participants received a copy of their transcript and were asked to review it for accuracy and to determine if they would like to add or clarify any information. Participants were specifically asked in a follow up email to provide feedback on the following:

- Were any specific transcription errors or omissions noted?
- Should any details be added to the transcript?
- Do any transcription details need to be corrected or changed?
- Are any grammatical changes or minor clarifications required?
- Should any specific statements be removed from the transcript?

- Should any specific statements be added to the transcript?

Participants were notified that any changes requested would be made to best reflect the true intent/meaning of their interview statements. A revised version of the transcript or summary would be sent back to the participant after corrections for approval, if requested. If approval was not attained after this review and edit process, the interview transcript would not be included in the research study.[94] A summary of the interview was also offered to the participant to ensure the researcher's interpretation of the overall interview was consistent with the participants' intent. None of the participants requested this nor were any changes to transcripts requested.

The credibility of qualitative research is also impacted by the researcher's skill or experience and competence. The piloting of the interviews with a participant from each group, a peer review, and consultation with the dissertation committee were methods employed to enhance the credibility of this work. Although the researcher had minimal personal experience in conducting qualitative research, one of the committee members, Dr. Sandee Dunbar, DPA, OTR/L, FAOTA, and Dr. Teresa Miller, PT, PhD, GSFP, the peer reviewer, are experienced qualitative researchers.

Reflection was used by the primary investigator to minimize bias that may have impacted the qualitative analysis.[118] The peer reviewer provided critical assessment of the primary researcher's analysis, probing for potential personal biases. The staged and supportive process of expert guidance aided in minimization or elimination of personal biases in the interpretation of the data.

One main areas of personal bias that was identified came from the researcher's professional identity; as a Director of Clinical Education for a PT academic program and

as a prior CI, the researcher developed preferences and beliefs about what constitutes "quality" clinical education instruction. Additionally, as a PT educator and as a clinician that holds evidence-based practice in high regard, the researcher identified a personal bias that STMs should be seen as valuable and useful when it might, in fact, not be viewed in this light by participants. These biases were acknowledged and discussed with the peer reviewer and kept independent from data interpretation.

Only the primary researcher was involved in conducting the interviews, transcribing, and initial review of data. After reviewing the transcripts as a whole for overall meaning, each interview transcript was reviewed to "sense themes",[119] identifying ideas (preliminary categories) as they presented in the data. An electronic spreadsheet was used to group initial categories/themes, significant statements and exemplars for each participant and then to categorize data across participants for similarities and differences using a constant comparative method.[120]

Saturation of data was not considered met until data in each category was "rich and thick and until it is replicated."[91(223)] This is an important element of transferability. It is recommended that negative cases are explored to ensure full and robust explication and verification of the data.[91] Contradictory evidence should be sought out, examined, and accounted for in the analysis to ensure researcher bias does not interfere with or alter perception of the data and any insights offered.[94] Clinical instructors with different levels of clinical practice and clinical education experience are represented. These CIs worked in a variety of clinical practice settings and with PT students from different PT academic programs. There was representation of PT students from more than one PT academic program, with clinical experiences in different practice settings. The breadth of

representation aids in transferability of findings. Contradictory evidence and/or inconsistent responses when identified were queried further during the respective interview. Consistency of responses and understanding of the importance of contradictory evidence contributes to credibility of the study. When no new direction or questions arose from data collection, data collection was considered complete.

Expert/peer review or debriefing is a valuable process to enhance methodological rigor. The peer reviewer "provides support, plays devil's advocate, challenges the researchers' assumptions, and asks hard questions about methods and interpretations."[118(p19)] This peer review adds credibility to the review of data and research processes. The peer reviewer, Dr. Terri Miller, PT, PhD, GSFP, provided support throughout the qualitative phase, from the initial stage of transcript review to the final coding and revision of the themes, subthemes and related operational definitions. No private, identifiable information was shared during the review process.

Qualitative data analysis. Inductive code development is considered sound for phenomenological methodology.[119] However, a hybrid approach may be more appropriate in a sequential explanatory mixed method design, blending prior data and research from the quantitative phase, with an openness to modification to hypothetical conceptual frameworks when it presents in the data. In this mixed method design, this process supplemented thematic code development.

Boyatiz[119] describes five steps in inductively developing a code: (1) reduction of raw information, (2) identification of themes within samples, (3) comparison of themes across subsamples, (4) creation of codes, and (5) assessment of the reliability of the codes.[119] Boyatiz[119] describes codes as "…a list of themes; a complex model with

themes, indicators, and qualifications that are causally related; or something in between these two forms."[119(p4)] Themes are patterns within the information that describe and organize observations or, potentially, lend to the interpretation of facets of the phenomenon.[119] Initial themes were generated through an open coding process, "assigning words or ideas to meaningful groups [codes] that symbolize the processes and significant incidents through which participants have made sense of their experiences."[121(p799)] Greater significance was placed on repetition of ideas and on statements within the interviews that were given emphasis or elicited an emotional response. Axial coding occurred after the initial open coding process; this allowed for an initial focus on relating concepts/codes to each other. Through explicit notations of all aspects of the phenomenon, the primary investigator attempted to bracket both prior knowledge and biases as well as keep fresh the perceptions from the interview experiences.[91]

Peer review process. After a preliminary review of transcripts by the researcher, a conceptual framework of themes and codes and how they might be interconnected was presented to the peer reviewer (Appendix 5). Initially, the primary researcher and the peer reviewer thoroughly reviewed one transcript from the CI group independently, considering the conceptual framework and operational definitions created by the researcher, and whether statements made by participants aligned with the framework or presented new findings. During a telephone meeting, the researcher and peer reviewer reviewed the transcript thoroughly for initial agreement or discussion if in conflict. An additional meeting took place to review sections of data from additional transcripts to ensure confidence in the codes identified across the sample. Numerous modifications,

additions, and deletions were made to the operational definitions and organization of the conceptual framework from this second meeting. Substantive changes were made to refine the codes under "personal/professional identity". A discrete category related to STM "benefit versus burden" was removed, with the themes, i.e. appropriateness and purpose, reallocated to a new code of "suitability". The revised conceptual framework and operational definitions were sent to the peer reviewer after the meeting. Verification that the edits made were reflective of our shared decisions about thematic codes was required before moving to the next stage.

An additional two rounds of thematic code review took place with additional transcript reviews, following the same process noted above. Additional modifications to the emerging thematic codes and respective definitions transpired. Substantive changes are reflected in (1) consolidation of a number of discreet open codes into broader open codes and definitions, (2) further relabeling/refinement of a number of codes and definitions, (3) additional open codes created when codes and definitions did not fully explain findings. Care was taken to ensure that the coding groups and their respective definitions were mutually exclusive and exhaustive. This multistage peer review process enhances the dependability and confirmability of this project.

Based on shared confidence in the revised codes identified or confirmed from these prior steps, reliability/interrater consistency analysis was performed. A double coding process, as described by Boyatzis[119], was employed. The researcher and the expert independently reviewed a selected ten percent of data segments from two transcripts, followed by comparison of results.[119] Percentage agreement between coders represented:

$$\text{Percentage agreement} = \frac{\text{Number of times both coders agreed}}{\text{Number of times coding was possible}}$$

Discussion between raters occurred until at least 80% agreement was attained based on the presence of the established codes.[100,119] Final percentage agreement attained on transcript one was 28/30 = 93.3%. Initial percentage agreement attained on transcript two was 43/50 = 86% and, after further discussion, agreement was 48/50 = 96%.

The researcher coded the remaining data independently once reliability/interrater consistency was established. Transcripts were uploaded to a computer-aided qualitative data analysis software program (CAQDAS), Atlast.ti® V8.0, linking text segments to thematic codes identified through the aforementioned peer review process of contrast, refinement, and exploration of concepts from the qualitative data. When management of a significant amount of textual data is present, as in this case, software can aid in the "ordering, structuring, retrieving and visualising tasks."[122(p74)] Coding of text segments incorporated a hybrid approach, with primarily sentence and paragraph/statement coding as overall meaning was the focus from a phenomenological perspective, rather than a strict adherence to line coding as is more consistent with a grounded theory approach. Data from the student group was deemed to be conceptually congruent with the framework and operational definitions identified in the CI group, with no initial need for further code development. A focus on collective themes was important for interpretation of the group experience and generalization of the findings. However, individual perspectives unique to a participant or participants were also presented, when applicable, during analysis.

Integration of quantitative and qualitative results. In this sequential explanatory mixed method study, collection, analysis and presentation of quantitative and qualitative data were integrated at two points in the research process. Creswell refers to this integration as critical to developing inferences, which are "conclusions drawn from both the quantitative and qualitative data as well as across them."[36] The two connection points in this research study were at the intermediate stage when the results of the data analysis from the surveys informed and guided the data collection from interviews in the second phase and at the final stage of interpretation and synthesis of the outcomes from the entire study.[36,118]

Synthesis of the data from the qualitative phase of the research led the researcher to revisit the findings from the quantitative phase, providing alternative explanations or support to the quantitative findings.[116] Re-contextualization came from the process of comparing and contrasting findings to the literature.[123] It was anticipated that, through the combination of quantitative and qualitative findings, that the study would provide a more robust and complete explanation to the overarching research questions, with these findings presented in Chapter Four. In Chapter Five, the findings from the quantitative analyses are interpreted with that from the qualitative phase, comparing and contrasting the findings from both phases to each other and to the literature. Through the provision of thick description of participant responses, the reader may decide on the transferability of these findings outside of the context of this study.

Data management. The disseminated research will only report data in the aggregate– no individual data/identifying information will be provided for any individual participating in the project. The primary investigator used SurveyMonkey®'s

procedures for anonymous surveys. With this option selected, SurveyMonkey® does not collect information that can connect data back to specific computers. These policies include the provision of adequate safeguards to ensure participant data is only used for the specified purpose and can only be accessed by the identified investigators. All manual and electronic data were maintained under comprehensive security and access controls that include password-protection for computers and electronic hard drives and locked cabinets for archiving of manual and electronic data.

Records maintained included copies of all research proposals reviewed, consent documents, and copies of all correspondences between the IRB and the investigator(s). Records were preserved in electronic form, and are accessible for audit purposes. Records for completed projects will be stored in secure locations with the same care used when the project was active. Continuation requests were filed with the respective IRBs as needed to extend the approval period beyond the maximum of one year.

Destruction of human subjects' research records will be performed in a fashion that protects the confidentiality of the research subjects. Paper records will be shredded and electronic media used to store data will be scrubbed after the files are deleted. Destruction of records will occur one year from the completion of research.

As is consistent with Clarkson University and Nova Southeastern University IRB protocols, de-identified data for future analysis in the context of the project will be maintained. Data will be considered to be completely de-identified when all links between individual identity and the data are destroyed. Research data is not considered de-identified simply because names have been removed if the data still contains information that might identify the participants such as date of birth, address, etc... There

was not a need to obscure data related to potentially identifiable information such as race/ethnicity, age and gender in survey or interview responses but this was considered. If concerns presented, responses would have been collapsed into categories to make individual identification less likely or may need to be omitted from the analysis. Seeking saturation of data and breadth and depth of responses in the interviews is an important part of rigorous qualitative data collection; however, responses from individual participants were thoroughly reviewed for potential identification "triggers" that would necessitate removal for confidentiality reasons.

Resources

The primary resources required for this project were the cost of incentives for survey participation and a recording device purchased for the interviews. Resources also included the purchase of the standard annual plan for the web-based survey platform, Survey Monkey®. A PhD graduate research assistant from Clarkson University's Mathematics and Data Analytics program provided assistance in quantitative data coding and complex statistical analyses at no cost to the researcher.

Summary

This mixed method study incorporated a non-experimental design and qualitative approach to examine CI and PT student characteristics and beliefs that influenced the use of STMs in clinical practice and to explore the alignment between the STMs students learn during their academic preparation to those commonly reported in contemporary clinical practice. The initial phase of this sequential explanatory study utilized web-based surveys designed by the primary investigator to investigate these factors. One-on-one interviews were conducted to examine PT student and CI perspectives on their lived

experience during terminal clinical education experiences. This mixed methods approach allowed for a deeper and more robust interpretation of expectations and experiences during clinical education and the factors that contribute to, or challenge, participants' use of STMs in clinical practice.

CHAPTER FOUR: RESULTS

Introduction

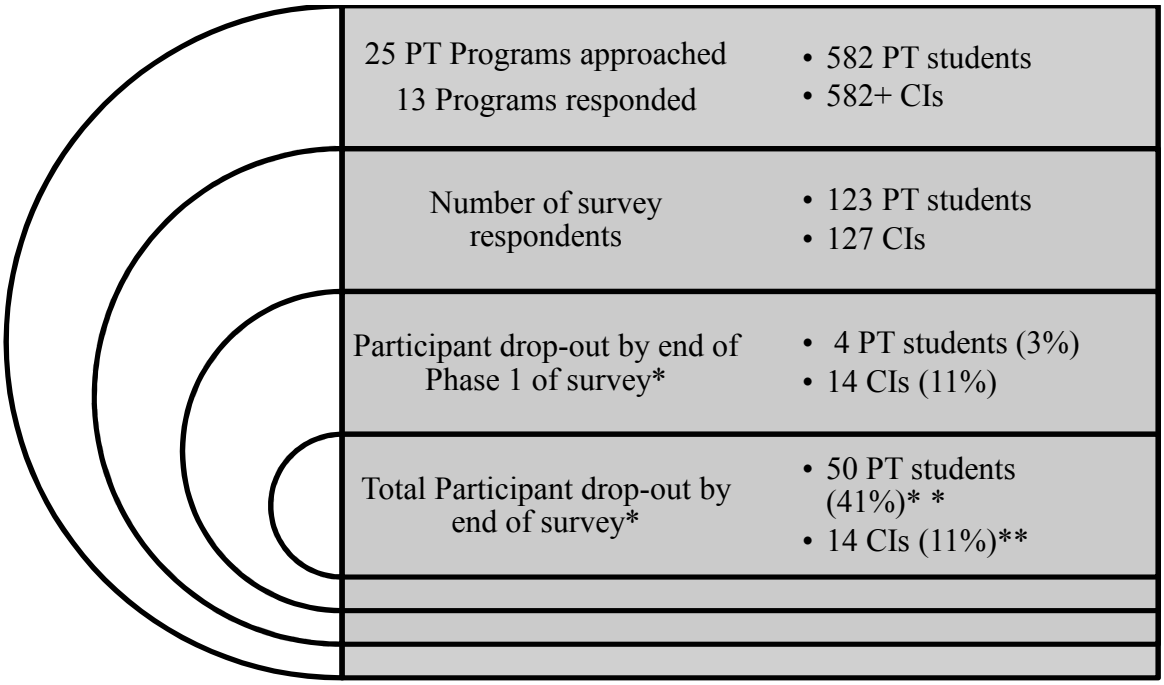
The quantitative and qualitative results of this dissertation are described in this section. The statistical software, IBM SPSS© Statistics Package, Version 25, was used for all quantitative data analyses. A qualitative phenomenological approach guided the one-on-one interviews and subsequent hybrid inductive coding approach to the analysis of data. Integration of findings from the quantitative phase aided in confirmation of the appropriateness of the interview guide for the qualitative phase and results from both phases of this mixed method dissertation were ultimately integrated for a more complete understanding of the research questions.

Quantitative Data Analysis

Survey Response Rate

The target populations for this study were PT students and the CIs associated with these PT students on a terminal CE. Twenty-five DCEs from accredited PT programs, primarily in the North East United States, received the request to distribute the survey recruitment communication to the target populations; 13 programs were represented in the survey responses for a 52% program participation rate. The survey recruitment communication was sent to 582 PT students. There were 123 PT student survey participants for a 21.1 % response rate. A few students had more than one CI for their experience. The DCEs did not report the total number of CIs that were sent the survey recruitment communication, but the number was anticipated to be a minimum of 582. A minimum of 582 CIs received the recruitment communication, with 127 survey participants for an approximate response rate of 21.8%. Attrition rate may not accurately

reflect actual drop-out, as both groups were allowed to skip items they did not use or were unfamiliar with in the second half of the survey. Due to limitations with the general practice area and population category data, results are presented descriptively or as a composite number based on verified responses only (Figure 3).



*Valid percent is reported and missing data excluded from analyses.
**Estimated attrition rate.

Figure 3. Flowchart of Survey Respondents

The number of PT student and CI responses from each program are noted in Table 1. A number of participants did not enter the identification code indicating their program affiliation; these PT students and CIs are listed as uncategorized responses. Uncategorized responses could not be used for comparisons with their clinical partner but were used for analysis related to between group and within group comparisons.

Table 1. Survey Responses by Physical Therapist Program

Program	Physical Therapist Student	Clinical Instructor
Program N	2	5
Program D	5	13
Program G	13	12
Program H	4	5
Program L	0	2
Program K	3	12
Program M	8	9
Program J	4	9
Program E	2	5
Program F	6	13
Program B	1	6
Program C	14	8
Program I	2	7
Total Coded Responses	**64 (52.0%)**[a]	**106(83.5%)**[a]
Uncategorized Responses	**59 (48.0%)**[a]	**21(16.5%)**[a]

[a]Number (percentage)

Demographic Data

The intent of this study was to examine attitudes and behaviors related to STMs in two groups, PT students and their CIs. It is important to examine the characteristics of the participants, in addition to their responses to the survey questions exploring their attitudes and behaviors, to identify characteristics that correlate with, or are predictive of, these constructs.

Demographic data from the PT students was collected from the surveys and encompassed preferred gender identity, race, ethnicity, and current academic grade point average (GPA). This data is collected by the CAPTE for PT students enrolled in accredited PT education programs; capturing this information allowed for comparison of the similarity of the study participants to the population they represent. Clinical practice setting, geographic location for the current CE, and primary clinical focus area were also collected. These characteristics are shown in Tables 2 and 3.

According to CAPTE, of the students enrolled in a PT program in 2015, 18% were minority students.[25] Data for 2015 enrollment was utilized, as this was the enrollment year that represented study participants best. In this study, 12.2% of participants identified race as not white/Caucasian. The average GPA of students enrolled in a PT program in 2015 was 3.5.[25] Study participants reported by GPA category, with 85.3% reporting a GPA of 3.51 or higher. For the GPA categories of 2.0-2.5, 2.51-2.99, and above 4.0, there were no responses; these categories have been omitted from Table 7. The mean clinical length was 10.5 weeks with SD =1.3, with a range of seven to 16 weeks reported with approximately 2/3 (65.1%) reporting their CE was in either private or health system outpatient practice.

Table 2. Comparison of Demographic Profiles of PT Student Participants to 2015 CAPTE Aggregate Program Data[25]

Demographics	**Participants** N=127	Percent (%)	**CAPTE** Percent (%)
Gender			
Male	33	26.8	----
Female	89	72.4	----
Transgender	0	0	----
Prefer Not to Share	1	0.8	----
Race			
African American or Black	1	0.8	3
American Indian or Alaskan	0	0	0.41
Asian	9	7.3	6.84
Pacific Islander or Native	1	0.8	0.39
White	108	87.8	85.26
Other	4	3.3	4.1
Ethnicity[a]			
Hispanic or Latino	3	2.4	----
Not Hispanic or Latino	118	95.9	----
Grade Point Average (GPA)			
3.0-3.25	3	2.4	----
3.26-3.5	11	8.9	----
3.51-3.75	49	39.8	----
3.76-4.0	56	45.5	----
Choose Not to Answer	4	3.2	----

Table 3. Demographic Profiles of PT Student Participants

Demographics	**Participants** N=123	Percent (%)
Current Clinical Practice		
Academic Institution	1	0.8
Acute Care Hospital	17	13.8
Health System/Hospital	36	29.3
Private Outpatient Office	44	35.8
Skilled Nursing Facility	3	2.4
Inpatient Rehabilitation	5	4.1
Patient's Home/Home Care	3	2.4
School System	9	7.3
Health and Wellness Facility	1	0.8
Industry	1	0.8
Other	3	2.4
Primary Clinical Focus Area		
Acute Care	13	10.6
Aquatic Physical Therapy	0	0
Cardiovascular Pulmonary	0	0
Clinical Electrophysiology	0	0
Geriatrics	7	5.7
Hand Rehabilitation	0	0
Lymphedema Management	0	0
Neurology	8	6.5
Oncology	1	0.08
Orthopedics	57	46.3
Pediatrics	17	13.8
Sports	5	4.1
Women's Health	0	0
Wound Management	1	0.08
Geographic Region[a]		
South Atlantic	21	17.1
Middle Atlantic	77	62.6
East North Central	1	0.8
New England	2	1.6
Pacific	3	2.4
East South Central	2	9.8
Mountain	12	9.8

[a]. Missing=2; [b]. Blend of Focus Areas=14

Demographic data from the CIs was also collected from the surveys and encompassed professional entry level physical therapy degree, highest earned degree, years in clinical practice, preferred gender identity, race, ethnicity, APTA membership,

ABPTS certification, primary clinical practice setting, years in current clinical practice setting, primary clinical focus area, geographic location, and the number of PT students supervised in the past two years. The demographic data collected are consistent with that of Jette et al.[68] These characteristics are provided in Table 4 and 5. Survey respondents were largely representative of the demographic trends available from the APTA.[108,124] Of the 23 respondents that indicated they had ABPTS certification, one (4.3%) had geriatric, five (21.7%) had neurology, 14(60.9%) had orthopedic, two (8.7%) had pediatric, and two (8.7%) had sports certifications. The ABPTS data indicates that these percentages are comparable to the percent distribution by specialty area with 2418(10.8%) geriatric, 2290(10.3%) neurology, 12893(57.9%), 1749(7.9%) pediatrics, and 2088(9.4%) sports certified specialists as of June, 2017.[124] Participants reported a range of 2 to 36 years of clinical practice with a mean of 11.7 years, SD=8.9. An average of 8.6 years (range 1-31), SD=7.5, was reported in CI participants' current practice setting. Participants indicated they had supervised a range of zero to 12 PT students over the past two years, with a mean of 3.13 students, SD=2.0.

Table 4. Comparison of Demographic Profiles of Clinical Instructor Participants to APTA PT Members[124]

Demographics	**Participants** N=127	Percent (%)	**APTA** Percent (%)
Gender			
Male	50	39.4	30.1
Female	73	57.5	69.9
Transgender	0	0	----
Prefer Not to Share	4	3.1	----
Race			
African American or Black	0	0	1.2
American Indian or Alaskan	1	0.8	0.8
Asian	11	8.7	4.7
Pacific Islander or Native	0	0	0.3
White	108	85.0	91.7

Table 4. Comparison of Demographic Profiles of Clinical Instructor Participants to APTA PT Members (continued)

Other	7	5.5	----
Ethnicity[a]			
Hispanic or Latino	9	7.1	2.4
Not Hispanic or Latino	114	89.6	97.6
Entry Level PT Degree			
Certificate	0	0	----
Baccalaureate/Bachelor's	25	19.7	41.9
Master's	31	24.4	27.9
Doctoral	69	54.3	25.5
Other	2	1.6	1.4
Highest Earned PT Degree[b]			
Baccalaureate/Bachelor's	12	9.4	19
Master's	22	17.3	27.8
DPT (Entry Level)	68	53.5	5.6
PhD (or Equivalent)	0	0	29.2
tDPT (Transition)	19	15.0	15.2
PhD (or Equivalent) and DPT	1	0.8	0.6
PhD (or Equivalent) and tDPT	0	0	0.6
Other	1	0.8	----

[a].Missing=4; [b].Missing=4

Table 5. Comparison of Demographic Profiles of Clinical Instructor Participants to APTA PT Members

Demographics	**Participants** N=127	Percent (%)	**APTA** Percent (%)
APTA Membership Status[a]			
Yes	55	43.3	30
No	69	54.3	70
ABPTS Certification[b]			
Yes	23	18.1	----
No	100	78.7	----
Primary Clinical Practice			
Academic Institution	0	0	10.4
Acute Care Hospital	20	15.7	11.0
Health System/Hospital	29	22.8	20.3
Private Outpatient Office	45	35.4	33.0
Skilled Nursing Facility	4	3.1	4.2
Inpatient Rehabilitation	5	3.9	3.9
Patient's Home/Home Care	0	0	6.7
School System	11	8.7	3.8
Health and Wellness Facility	1	0.8	0.3
Industry	8	6.3	0.5

Table 5. Comparison of Demographic Profiles of Clinical Instructor Participants to APTA PT Members (continued)

Other	4	3.1	5.9
Acute Care	16	12.6	----
Aquatic Physical Therapy	1	0.8	----
Cardiovascular Pulmonary	0	0	----
Clinical Electrophysiology	0	0	----
Geriatrics	6	4.7	----
Hand Rehabilitation	0	0	----
Lymphedema Management	0	0	----
Neurology	10	7.9	----
Oncology	2	1.6	----
Orthopedics	61	48.0	----
Pediatrics	16	12.6	----
Sports	4	3.1	----
Women's Health	0	0	----
Wound Management	1	0.8	----
Geographic Region[c]			
South Atlantic	13	10.2	----
Middle Atlantic	81	63.8	----
East North Central	2	1.6	----
West North Central	6	4.7	----
New England	2	1.6	----
Pacific	5	3.9	----
East South Central	3	2.4	----
Mountain	12	9.4	----

[a]. Missing=3; [b]. Missing=4; [c]. Missing=3; [d]. Blend of Focus Areas=10

Descriptive Statistics

Descriptive statistics for responses to the PT student and CI survey questions are categorized by construct, i.e. confidence, value, attitudes/beliefs, and knowledge/use. Medians and interquartile ranges (IQR) are reported as measures of central tendency and dispersion. Frequency distributions provide a representation of the pattern of responses. Valid percent is reported; the valid percent is the percent when missing data is excluded.

Confidence. Students provided pre-clinical and post-clinical confidence ratings in the selection, administration, and interpretation of STMs. Frequency distributions, valid percent, median and interquartile ranges (IQR) are illustrated in Tables 6-8.

Table 6. Physical Therapist Student: Confidence in Selection of Standardized Tests and Measures

		Frequency		Valid Percent	
		Pre	Post	Pre	Post
Valid	Not confident at all	1	0	.8	0
	Slightly confident	28	3	23.7	2.5
	Somewhat confident	47	18	39.8	15.1
	Confident	40	68	33.9	57.1
	Very confident	2	30	1.7	25.2
	Total	118	119	100.0	100.0
Missing		5	4		
Total		123	123		
Median (IQR)		2 (1.75, 3)	3 (3,4)		

Table 7. Physical Therapist Student: Confidence in Administration of Standardized Tests and Measures

		Frequency		Valid Percent	
		Pre	Post	Pre	Post
Valid	Not confident at all	10	0	8.4	0
	Slightly confident	27	4	22.7	3.4
	Somewhat confident	46	24	38.7	20.2
	Confident	32	65	26.9	54.6
	Very confident	4	26	3.4	21.8
	Total	119	119	100.0	100.0
Missing		4	4		
Total		123	123		
Median (IQR)		2 (1,3)	3 (3)		

Table 8. Physical Therapist Student: Confidence in Interpretation of Standardized Tests and Measures

		Frequency		Valid Percent	
		Pre	Post	Pre	Post
Valid	Not confident at all	5	0	4.2	0
	Slightly confident	21	6	17.8	5.1
	Somewhat confident	44	16	37.3	13.6

Table 8. Physical Therapist Student: Confidence in Interpretation of Standardized Tests and Measures (continued)

	Confident	42	67	35.6	56.8
	Very confident	6	29	5.1	24.6
	Total	118	118	100.0	100.0
Missing		5	5		
Total		123	123		
Median (IQR)		2 (2,3)	3 (3)		

Clinical instructors were asked to consider their change in confidence using STMs based on their current PT student's clinical experience. Frequency distribution, valid percent, median and interquartile range (IQR) are illustrated in Table 9.

Table 9. Clinical Instructor: Confidence in Using Standardized Tests and Measure

		Frequency	**Valid Percent**
Valid	Less than it was before this clinical experience	4	3.4
	The same as it was before this clinical experience	88	75.9
	More than it was before this clinical experience	24	20.7
	Total	116	100.0
Missing		11	
Total		127	
Median (IQR)		1 (1)	

Value. Students were queried regarding STM value to physical therapist clinical practice, to the clinical practice where they were completing their CE, and personal value. Frequency distribution, valid percent, median and IQR are presented in Tables 10 and 11.

Table 10. Physical Therapist Student: Value of Standardized Tests and Measures to Physical Therapist Clinical Practice and Current Clinical Practice

		Physical Therapist Clinical Practice		Current Clinical Practice	
		Frequency	**Valid Percent**	**Frequency**	**Valid Percent**
Valid	Never of value	0	0	1	0.8
	Not often valuable	2	1.7	7	5.9
	Neutral	12	10.2	21	17.6
	Often valuable	70	59.3	60	50.4
	Always valuable	34	28.8	30	25.2
	Total	118	100.0	119	100.0
Missing		5		4	
Total		123		123	
Median (IQR)		3(3,4)		3 (3,4)	

Table 11. Physical Therapist Student: Personal Value in the Use of Standardized Tests and Measures

		Frequency	**Valid Percent**
Valid	Less than I did before this clinical experience	1	.8
	The same as I did before this clinical experience	69	58.8
	More than I did before this clinical experience	49	41.2
	Total	119	100.0
Missing		4	
Total		123	
Median (IQR)		2 (2,3)	

Clinical Instructors were also queried regarding STM value to physical therapist profession and to their current clinical practice. Frequency distribution, valid percent, median and IQR are presented in Table 12.

Table 12. Clinical Instructor: Value of Standardized Tests and Measures to Physical Therapist Clinical Practice and Current Clinical Practice

		Physical Therapist Profession		Current clinical practice	
		Frequency	**Valid Percent**	**Frequency**	**Valid Percent**
Valid	Never of value	1	.9	3	2.5
	Not often valuable	9	7.7	19	16.1
	Often valuable	81	69.2	71	60.2
	Always valuable	26	22.2	25	21.2
	Total	117	100.0	118	100.0
Missing		10		9	
Total		127		127	
Median (IQR)		2 (2)		2 (2)	

Clinical instructor attitudes and beliefs. Clinical instructors provided level of agreement to statements exploring attitudes and beliefs related to STMs. Frequency distribution and valid percent are presented in Tables 13-15. The median response for all items in Q18 was 2.00, representing "agree somewhat" with statements related to their reasons to use STMs. An IQR (2,3) was noted for items 18.a-d, f-h, j-k. An IQR (1,3) was noted for the remaining items in Q18.

Table 13. Clinical Instructor Attitudes and Beliefs: Reasons to Use Standardized Tests and Measures

	Number (Valid Percent)				
Standardized tests and measures…	**Total**	**Definitely agree**	**Agree somewhat**	**Disagree somewhat**	**Definitely Disagree**
a. Help direct the plan of care	117	51 (43.6)	57(48.7)	7(6.0)	2(1.7)
b. Enhance communication between the therapist and patient/client	117	42(35.9)	64(54.7)	9(7.7)	2(1.7)
c. Enhance communication with physicians and other healthcare providers	116	46(39.7)	56(48.3)	14(12.1)	0(0)

Table 13. Clinical Instructor Attitudes and Beliefs: Reasons to Use Standardized Tests and Measures (continued)

d. Help patients/clients feel that therapists are thorough in examination	117	53(45.3)	51(43.6)	11(9.4)	2(1.7)
e. Increase efficiency of examinations	116	40(34.5)	39(33.6)	32(27.6)	5(4.3)
f. Attain better outcomes	116	37(31.9)	58(50.0)	17(14.7)	4(3.4)
g. Help motivate and encourage patients/clients	115	41(35.7)	47(40.9)	21(18.3)	6(5.2)
h. Enhance communication and/or decrease rates of denial from third-party payors	116	53(45.7)	52(44.8)	6(5.2)	5(4.3)
i. Enhance marketing of practice/services	116	15(12.9)	57(49.1)	32(27.6)	12(10.3)
j. Are mandated/required for all patients/clients	117	39(33.3)	55(47.0)	14(12.0)	9(7.7)
k. Are mandated/required for patients/clients with certain types of conditions	117	38(32.5)	55(47.0)	14(12.0)	10(8.5)

Question 19 explored factors that CIs felt influenced the selection of STMs. The median response for all items in Q19 was 2.00, representing "moderately influences", with the exception of Q19d with a median response of 3.00 ("strongly influences"). Interquartile range =2,3 was found for items Q19a,d, e with an IQR=1,3 for Q19b and IQR=1,2 for q19c. (Table 14)

Table 14. Clinical Instructor Attitudes and Beliefs: Factors Influencing Selection of Standardized Tests and Measures

	Number (Valid Percent)				
	Total	**Strongly influences**	**Moderately influences**	**Minimally influences**	**No influence at all**
a. Sound psychometric properties	116	46(39.7)	50(43.1)	14(12.1)	6(5.2)

Table 14. Clinical Instructor Attitudes and Beliefs: Factors Influencing Selection of Standardized Tests and Measures (continued)

b. Facility expectation	117	33(28.2)	46(39.3)	21(17.9)	17(14.5)
c. Reimbursement requirement	117	27(23.1)	51(43.6)	12(10.3)	27(23.1)
d. Ease of use	117	61(52.1)	47(40.2)	6(5.1)	3(2.6)
e. Useful for a variety of purposes	115	37(32.2)	52(45.2)	19(16.5)	7(6.1)

Question 20 explored benefits and barriers to the use of STMs, with some statements phrased positively and others negatively phrased to minimize response set bias. The median response for items Q20b.-f., h.-k. was 2.00, "agree somewhat", with the median for the remaining items of 1.00 "disagree somewhat". Interquartile ranges for items Q20a. and g. = 1,2, IQR=2,2 for items Q20b,c,e,f,h,j the IQR=2,3, and for the remaining items the IQR=1,2 (Table 15).

Table 15. Clinical Instructor Attitudes and Beliefs: Barriers and Benefits to the Use of Standardized Tests and Measures

	Number (Valid Percent)				
Standardized tests and measures…	**Total**	**Agree completely**	**Agree somewhat**	**Disagree somewhat**	**Disagree completely**
a. Are confusing to patients	115	5(4.3)	58(50.4)	41(35.7)	11(9.6)
b. Are easy for patients/clients to complete independently	115	5(4.3)	54(47)	46(40)	10 (8.7)
c. Are at an appropriate reading level for most patients/clients	114	19(16.7)	63(55.3)	25(21.9)	7(6.1)
d. Are in a language in which many of my patients/clients are not fluent	114	6(5.3)	36(31.6)	43(37.7)	29(25.4)

Table 15. Clinical Instructor Attitudes and Beliefs: Barriers and Benefits to the Use of Standardized Tests and Measures (continued)

e. Are not sensitive to cultural/ethnic concerns of many patients/clients	112	4(3.6)	41(36.6)	40(35.7)	27(24.1)
f. Make patients/clients anxious	116	5(4.3)	46(39.7)	53(45.7)	12(10.3)
g. Take too much time to administer	116	11(9.5)	50(43.1)	45(38.8)	10(8.6)
h. Are easy to analyze/calculate/score	117	25(21.4)	75(64.1)	15(12.8)	2(1.7)
i. Provide useful information	117	42(35.9)	69(59)	3(2.6)	3(2.6)
j. Require more effort than they are worth	116	4(3.4)	34(29.3)	51(44)	27(23.3)
k. Contain information that helps to direct the plan of care	116	38(32.8)	60(51.7)	16(13.8)	2(1.7)
l. Are difficult to interpret	115	1(.9)	21(19.1)	66(57.4)	27(23.5)
m. Do not contain the types of items or questions that are relevant for the type of patients/clients I see	114	7(6.1)	35(30.7)	49(43)	23(20.2)

Knowledge/Use. Students were asked to reflect on whether they were using STMs more than, about as much, or less than they anticipated during their clinical experience. The CIs were asked a question in parallel with responses ranging from more frequently, with the same frequency, or less frequently than they did before this clinical experience. The median response for CIs and students was 1.00 (IQR=1), "with the same frequency as I did before this clinical experience" for CIs and "about as much as I anticipated" for students. Of the 115 collected CI responses for this question, 15.7% (n=18) indicated they were using STMs more frequently, 80.9% (n=93) with the same frequency, and 3.5% (n=4) less frequently than before this clinical experience. Of the 119 valid student responses to this question, 21.1% (n=25) used STMs less than anticipated, 58% (n=69) about as much as anticipated, and 21% (n=25) more than anticipated.

Clinical instructors were asked to consider their current PT student's clinical experience when responding to the statement: "I am using standardized tests and measures for:" Ninety-seven respondents (85.8%) indicated they were using STMs for the same reasons and 16 (14.2%) responded use for different reasons than they did before this clinical experience. Seventy-four (65%) of the 113 CIs completing the second half of the survey reported using at least one STM.

Standardized tests and measures. The STMs presented to both CIs and students were categorized into the following general practice area or population categories: (1) acute care, (2) cardiovascular and pulmonary, (3) geriatrics and home health, (4) hand rehabilitation, (5) orthopedic/musculoskeletal, (6) neurological, (7) oncology, (8) pediatrics, and (9) women's health. Tabular presentation of frequency distributions and percent for each category are archived in Appendix 5, secondary to space constraints. Additional STMs that were reported as used or learned by participants that were not represented in the survey for a practice area or population category are provided in Appendix 5.

Ten STMs were identified by CIs as learned from a student, with the Patient Specific Functional Scale (PSFS), Ten-meter Walk Test, (10MWT), and Five Times Sit to Stand (FTSTS) reported across more than one STM category. These items are presented in Table 16.

Table 16. Standardized Tests and Measures Learned From a Physical Therapist Student

Category	**Standardized Test or Measure**
Acute	Tinetti Mobility Scale
Cardivascular and Pulmonary	Modified Chair Step Test

Table 16. Standardized Tests and Measures Learned From a Physical Therapist Student (continued)

	10-meter walk test (10MWT)
Geriatrics and Home Health	Patient Specific Functional Scale (PSFS)
Hand Rehabilitation	PSFS*
Orthopedics	Five time sit to stand (FTSTS)
	Gastrocnemius Stretch
	PSFS
	Talocrural Joint Posterior Glide Test
Neurology	10MWT
	FTSTS
	Sharpened Romberg test
Oncology	10MWT
	Shoulder Pain And Disability Index (SPADI)
Pediatrics	Movement Assessment Battery for Children (ABC)

*Reported by 2 Participants

Quantitative Statistical Results

The following null hypotheses were explored through statistical analyses:

$H1_{0:}$ CI and PT characteristics will not be associated with, or predictive of, STM attitudes or behaviors.

$H2_0$: No differences will exist between CIs and their PT students in STM knowledge/use and/or perception of STM value.

$H3_0$: No change will exist in CI or PT student report of attitudes or behaviors associated with STMs after the clinical experience.

$H4_0$: PT student and CI characteristics will not be associated with, or predictive of, a change in attitudes or behaviors in STMs in their clinical partner after a clinical experience.

This section is organized into within group, between group and 'linked' subgroup analyses.

Within group analyses. ***Clinical instructor: reduction of data related to Standardized test and measure attitudes and beliefs.***

Question 20 (Q20) from the CI survey represented a mix of positively and negatively oriented questions regarding STMs. Negatively phased items were reverse coded prior to analyses. Five iterations of PCA led to the identification of four distinct Q20 component factors from the 13 sub-questions in Q20. Although further reduction of the rotated matrix could have potentially led to a more simplified form, the 4 factors identified were are all distinct and explainable so further reduction was curtailed. Visual analysis of the distribution of factors was satisfactory for analysis. The first factor accounted for 27.2% of the variance, the second factor for 14.9%, the third factor for 12.5%, and the fourth factor accounted for 10.4%. Regression weighting scores were created and carried forward for analysis. Table 17 displays the items and factor loadings for the rotated factors, with loadings less than 0.3 omitted for ease of interpretation. The Scree Plot (Appendix 5) shows only the four factors described here that met eigenvalues greater than 1.0. Normality of the component factors identified in the PCA are presented in Appendix 5.

The following component factors were identified:

- Component factor one encompassed Q20a: “confusing to patients/clients”, Q20f: “make patients/clients anxious”, Q20j: “require more effort than they are worth”, Q20l: “are difficult to interpret”, and Q20m: “do not contain the types of items or questions that are relevant for the type of patients/clients I see”. This will be referred to as “STM Burden”.

- Component factor two encompassed Q20b: “are easy for patients/clients to complete independently”, Q20c: “are at an appropriate reading level for most patients/clients, Q20h: ‘are easy to analyze/calculate/score”. This will be referred to as “STM Ease of use/applicability”.
- Component factor three encompassed Q20i: “provide useful information”’, Q20k: “contain information that helps to direct the plan of care”. This will be referred to as “STM Utility”.
- Component factor four encompassed Q20d: “are in a language in which my patients/clients are not fluent”, Q20e: “are not sensitive to cultural/ethnic concerns of my patients/clients,” and Q20f: “make patients/clients anxious”. This will be referred to as “STM patient/client factors”.

Table 17. Principal Components Analysis: Question 20 Component Loadings for the Rotated Components

	Component Loading			
Item	1	2	3	4
a. Are confusing to patients	.70		-*	
b. Are easy for patients/clients to complete independently		.82	-*	
c. Are at an appropriate reading level for most patients/clients		.88	-*	
d. Are in a language in which many of my patients/clients are not fluent		-*	-*	.81
e. Are not sensitive to cultural/ethnic concerns of many patients/clients			-*	.87
f. Make patients/clients anxious	.47	-*		.52
g. Take too much time to administer	.69			-*
h. Are easy to analyze/calculate/score	-*	.62		-*
i. Provide useful information	-*	-*	.91	
j. Require more effort than they are worth	.76		-*	
k. Contain information that helps to direct the plan of care	_*		.91	

Table 17. Principal Components Analysis: Question 20 Component Loadings for the Rotated Components (continued)

l. Are difficult to interpret	.74	-*	-*	
m. Do not contain the types of items or questions that are relevant for the type of patients/clients I see	.64		-*	
Eigenvalues	3.54	1.91	1.62	1.35
% of variance	27.20	14.72	12.47	10.39

*Loadings less than .3 are omitted.
Extraction method: Principal Components Analysis
Rotation Method: Varimax with Kaiser Normalization

The STM Burden factor loads primarily on perceptions regarding general ease or difficulty of test application and interpretation. The STM Patient/client factor is more patient/client-oriented, loading on language barriers, cultural insensitivity, and anxiety for patients/clients. "Makes patients/clients anxious" is the only variable split somewhat evenly between these two factors. The STM ease of use/applicability factor is focused on ease of use and applicability, as well as appropriate reading level; the STM Utility factor relates to usefulness of information to direct the plan of care, representative of concept of utility.

Question 18 from the CI survey represented statements primarily related to the perceived value of STMs, with two items exploring whether STMs were mandated/required. Principal component analysis was performed on Q18 from the CI survey, reducing the data and creating regression weighting scores for further analyses.

Only one component factor was extracted from the Q18 PCA, with 55.76% of the variance in the model associated with this factor (Table 18). The Scree Plot (Appendix 5) provides a visualization of the fraction of the total variance in the data explained by each component factor, with only the one component factor exceeding an eigenvalue greater

than 1.0. Component factor 1 is comprised of nine of the 11 items in Q18 and relates to intrinsic/personal value and benefit from STMs. Herein, Q18 component factor one will be referred to as “Intrinsic regard”.

The two remaining items for Q18 represent extrinsic factors associated with STMs, i.e. ‘are mandated/required for all patients/clients’ and ‘are mandated/required for patients/clients with certain types of conditions’.

Table 18. Principal Component Analysis: Component Score Coefficient Matrix for Question 18

	Component								
Item	1	2	3	4	5	6	7	8	9
a. Help direct the plan of care	.16								
b. Enhance communication between the therapist and patient/client	.15								
c. Enhance communication with physicians and other healthcare providers	.12								
d. Help patients/clients feel that therapists are thorough in examination	.17								
e. Increase efficiency of examinations	.15								
f. Attain better outcomes	.16								
g. Help motivate and encourage patients/clients	.15								
h. Enhance communication and/or decrease rates of denial from third-party payors	.13								
i. Enhance marketing of practice/services	.15								
j. Are mandated/required for all patients/clients	--								
k. Are mandated/required for patients/clients with certain types of conditions	--								
Total	5.02	.81	.62	.58	.53	.50	.37	.28	.24
Percent (%) of variance	55.76	8.98	7.5	6.48	5.86	5.53	4.05	3.14	2.67

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Correlations. Correlations from the Q18 and Q20 items were assessed parametrically with Pearson correlation coefficient and nonparametrically with Spearman's rho correlation coefficient, with overall consistent results. For interpretation, the nonparametric results are considered adequately representative and more robust to assumptions, given the ordinal nature of the two Q18 items related to mandatory use of STMs that were not manipulated into pseudocontinuouus variables. Table 19 presents the bivariate correlation matrix for the component factors created from Q18 and Q20 and the two remaining items from Q20; *p* value is provided for statistically significant items only.

Significant, excellent correlations (>0.75) were identified between the items from Q18 related to mandatory requirement for STM use. A moderate, significant correlation (0.50-0.75) was identified between STM Utility and Intrinsic regard factors. Fair signficant correlations (0.25-0.50) were identified between STM ease of use/applicability factor, each of the Q18 items related to mandatory use, intrinisic regard. Although significance was reached for the STM burden factor and intrinisic regard, between STM utility and both Q18 items related to mandatory use, the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified.

Table 19. Clinical Instructor Correlation Matrix for Questions 18 and 20

Factor	Correlation	SM Burden	SM Ease of Use	SM Utility	Client Factors	SM Patient Regard	Intrinsic Regard	Mandatory-Pt.	Mandatory-Cond.
SM Burden	Pearson	-							
	Spearman's rho	-							
SM Ease of Use	Pearson	.00	-						
	Spearman's rho	-.01	-						
SM Utility	Pearson	.00	.00	-					

Table 19. Clinical Instructor Correlation Matrix for Questions 18 and 20 (continued)

	Spearman's rho	.08	.02	-				
SM Patient	Pearson	.00	.00	.00	-			
Client	Spearman's rho	.01	.01	.03	-			
Factors								
Intrinsic	Pearson	.11	.21*	.64**	-.11	-		
Regard	Spearman's rho	.22*	.17	.55**	-.07	-		
Mandatory-	Pearson	-.01	.40**	.26**	-.12	.42**	-	
Pt.	Spearman's rho	.02	.42**	.20*	-.09	.36**	-	
Mandatory-	Pearson	-.01	.36**	.33**	-.11	.43**	.97**	-
Cond.	Spearman's rho	.00	.37**	.24*	-.08	.37**	.97**	-

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM=Standardized Test and Measures
Mandatory-Pt.= Q18 item 'are mandated/required for patients/clients
Mandatory-Cond.= Q18 item 'are mandated/required for patients/clients with certain types of conditions

Statistically significant nonparametric correlations were found between many CI demographic variables and survey question responses as illustrated in Tables 20-30. Results are split into multiple tables for better visual representation; *p* value is provided for statistically significant correlations only.

A fair, significant, inverse correlation (0.25-0.50) was identified between APTA member status and item response 'STMs have sound psychometric properties'. Although significance was reached for 'STMs are mandatory for all patients/clients and highest earned degree and gender, 'STMs have sound psychometric properties' and between race and ABPTS certification, and between 'STMs are easy to use' and years in clinical practice, the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified. (Table 20)

Table 20. Clinical Instructor Correlation Matrix: Demographic Characteristics and Survey Responses

	STMs are mandatory for all patients/clients	STMs have sound psychometric properties	Use of STMs is facility expectation	Use of STMs is reimbursement requirement	STMs are easy to use	STMs are useful for variety of purposes
Entry level degree	-.02	-.04	.06	.10	.11	.04
Highest earned degree	.19*	-.01	.06	-.10	-.18	.00
Years in clinical practice	-.17	-.05	-.12	-.18	-.24*	-.15
Gender	-.22*	.00	-.12	-.18	-.05	.03
Ethnic origin	.08	.06	.11	.05	-.01	-.11
Race	-.11	-.23*	-.09	.05	-.15	-.03
APTA member	-.13	-.26*	-.03	-.08	-.10	.08
ABPTS Cert.	-.04	-.18*	-.01	.13	.10	.16

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
APTA=American Physical Therapy
ABPTS cert.=American Board of Physical Therapist Specialties Certification
STM=Standardized Tests and Measures

Significant, fair, inverse correlations (0.25-0.50) were identified between race and changes in STM frequency of use and change in reason for use. Although significance was reached for changes in STM frequency of use and highest earned degree and APTA member status, and between APTA member status and value to clinical practice, the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified (Table 21).

Table 21. Clinical Instructor Correlation Matrix: Demographic Characteristics and Survey Responses

	Value to PT profession	Value to clinical practice	STM use frequency change	STM confidence change	Change in STM reason to use	Change in STM value
Entry level degree	-.16	-.10	.05	-.14	-.04	-.13
Highest earned degree	.04	.07	.22*	.15	-.01	.16
Yrs. in clinical practice	.02	-.06	-.16	.02	-.10	.04
Gender	.02	-.05	-.02	.02	.15	.02
Ethnic origin	-.01	-.13	-.09	.07	.00	.07
Race	-.14	-.18	-.31**	-.10	-.28**	-.12
APTA member	-.04	-.21*	-.23*	.02	-.07	-.01
ABPTS Cert.	.01	-.18	-.04	.05	.17	-.04

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
APTA=American Physical Therapy; STM= Standardized Tests and Measures
ABPTS cert.=American Board of Physical Therapist Specialties Certification

A fair, significant, inverse correlation (0.25-0.50) was identified between gender and STM ease of use/applicability factor. Siggnificance was reached for STM burden factor and APTA member status and ABPTS certification, but the correlation equivalent strengths were low (0.00-0.25) (Table 22).

Table 22. Clinical Instructor Correlation Matrix: Demographic Characteristics and Factors from the Principal Component Analysis

	STM Burden	STM Ease of Use	STM Utility	STM Patient Client Factors	Intrinsic Regard
Entry level degree	.00	-.17	-.05	-.01	-.02
Highest earned degree	.02	-.10	.12	-.17	.12
Years in clinical practice	.02	.16	-.18	.06	-.08
Gender	.05	-.36**	-.06	.03	.05
Ethnic origin	-.18	.10	.09	.07	-.01
Race	-.08	-.06	-.06	.12	-.11
APTA member	-.19*	.07	-.05	.00	-.03
ABPTS Cert.	-.22*	-.15	.03	.02	.00

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
APTA=American Physical Therapy Association; STM= Standardized Tests and Measures

ABPTS cert.=American Board of Physical Therapist Specialties Certification

A fair, significant, inverse correlation (0.25-0.50) was identified between number of PT students supervised in the past 2 years and ease of STM use. Although significance was reached for years in current practice setting and 'STMs are mandatory for all patients/clients' and ease of STM use, and between number of PT students supervised in the past 2 years and 'use of STMs is a reimbusement requirement', the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified (Table 23).

Table 23. Clinical Instructor Correlation Matrix: Practice Demographic Characteristics and Survey Responses

	STMs are mandatory for all patients/clients	STMs have psychometric properties sound	Use of STMs is facility expectation	Use of STMs is reimbursement requirement	STMs are easy to use	STMs are useful for variety of purposes
Primary clinical practice setting	-.01	-.04	-.11	-.16	-.05	.11
Years in current practice setting	-.20*	-.08	-.14	-.19	-.23*	-.18
Primary clinical focus area	-.06	-.07	-.04	-.11	.06	-.03
# students supervised/2 years	-.04	.05	-.12	-.20*	-.25**	-.07
Geographic region of practice	-.16	-.12	-.11	-.02	-.04	-.03

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM=Standardized Tests and Measures

Although significance was identified for primary clinical focus area and value to the PT profession, and between number of students supervised in past two years and a change in STM value, the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified (Table 24).

Table 24. Clinical Instructor Correlation Matrix: Practice Demographic Characteristics and Survey Responses

	Value to PT profession	Value to clinical practice	STM use frequency change	STM confidence change	Change in STM use reason to	Change in STM value
Primary clinical practice setting	-.07	.15	.11	.04	.09	.09
Years in current practice setting	-.10	-.07	-.18	-.16	-.04	-.14
Primary clinical focus area	-.22*	-.00	-.06	-.10	-.05	-.08
# students supervised/2 years	.02	-.03	-.08	-.14	.01	-.21*
Geographic region of practice	-.15	-.00	-.06	-.14	-.17	.04

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM=Standardized Tests and Measures

A fair, significant, inverse correlation (0.25-0.50) was identified between primary clinical focus area and STM Burden. Although significance was identified for primary clinical focuse area and STM Utility, the correlation equivalent strength was low (0.00-0.25). No other statistically significant correlations were identified (Table 25).

Table 25. Clinical Instructor Correlation Matrix: Practice Demographic Variables and Q20 and Q18 Principal Component Factors

	STM Burden	STM Ease of Use	STM Utility	STM Patient Factors	Intrinsic Regard
Primary clinical practice setting	.11	-.07	-.01	-.07	.01
Years in current practice setting	-.12	.08	-.17	.11	-.12
Primary clinical focus area	.05	-.09	-.24*	-.04	-.26**
# Students supervised/2 years	.05	.03	-.15	-.01	-.04
Geographic region of practice	.01	-.10	-.01	.07	-.08

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM= Standardized Tests and Measures

Significant, fair correlations (0.25-0.50) were identified between "STMs are mandatory for all patients/clients" and all Q19 items with the exception of ease of use and usefulness for a variety of purposes which reached significance but with low correlation (0.00-0.25). "STMs have sound psycometric qualities" and use of STMs as a facility expectation and usefulness of STMs for a variety of purposes were also significant, fair correlations. Use of STMs as a facility expectation and "STMs are mandatory for all patients/clients" and ease of STM use and indication that STMs were a reimbursement requirement were also significant, fair correlations. Use of STMs as a reimbursement requirement had significant, fair correlations with use of STMs as a facility expectation and ease of STM use. A significant, fair correlation was noted between ease of STM use and "STMs are useful for a variety of reason"'. Although significance was identified for a number of other items, the correlation equivalent strength was low (0.00-.25). No other statistically significant correlations were identified (Table 26).

Table 26. Clinical Instructor Correlation Matrix: Survey Responses

	STMs are mandatory for all patients and clients	**STMs have sound psychometric properties**	**Use of STMs is facility expectation**	**Use of STMs is reimbursement requirement**	**STMs are easy to use**	**STMs are useful for variety of**
STMs are mandatory for all patients/clients	-					
STMs have sound psychometric properties	.34**	-				
Use of STMs is facility expectation	.27**	.25**	-			

Table 26. Clinical Instructor Correlation Matrix: Survey Responses (continued)

Use of STMs is reimbursement requirement	.33**	.08	.38**	-		
STMs are easy to use	.23*	.22*	.29**	.33**	-	
STMs are useful for variety of purposes	.23*	.30**	.15	.17	.29**	-

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM= Standardized Tests and Measures

Significant, fair correlations (0.250-.50) were identified between "STMs are mandatory for all patients/clients" and STM value to clinical practice, value to clinical practice and "STMs have sound psychometric qualities", between usefuless of STMs for a variety of purposes and value to profession, value to clinical practice and change in STM reason for use. Although significance was identified for value to profession and "STMs are mandatory for all patients/clients", the correlation equivalent strength was low (0.00-0.25). No other statistically significant correlations were identified (Table 27).

Table 27. Clinical Instructor Correlation Matrix: Survey Responses

Variables	Value to PT Profession	Value to clinical practice	STM use frequency change	STM confidence change	Change in STM reason to use	Change in STM value
STMs are mandatory for all patients/ Clients	.19*	.27**	.09	-.01	-.06	-.01
STMs have sound psychometric properties	.23*	.42**	.09	.05	.17	-.02
Use of STMs is facility expectation	.09	.11	.10	.17	.06	.16

Table 27. Clinical Instructor Correlation Matrix: Survey Responses (continued)

Use of STMs is reimbursement requirement	.00	-.02	-.03	.09	-.11	.07
STMs are easy to use	.11	.09	.01	-.03	.11	-.02
STMs are useful for variety of purposes	.28**	.32**	.17	.17	.26**	.14

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM=Standardized Tests and Measures

Significant, fair correlations (0.25-0.50) were identified between "STMs are mandatory for all patients/clients" and STM ease of use/applicability and intrinsic regard, between "STMs have sound psychometric qualities" and STM utility and intrinsic regard, and between "STMs are useful for a variety of purpose"' and utility and intrinsic regard. Although significance was identified for "STMs are mandatory for all patients/clients" and STM utility, between intrinsic regard and "use of STMs as a facility expectation", and between STM burden and "use of STMs is a reimbursement requirement", the correlation equivalent strengths were low (0.00-0.25). No other statistically significant correlations were identified (Table 28).

Table 28. Clinical Instructor Correlation Matrix: Individual Survey Items and Principal Component Factors

	STM Burden	**STM Ease of Use**	**STM Utility**	**STM Patient Client Factors**	**Intrinsic Regard**
STMs are mandatory for all patients/clients	.02	.26**	.19*	-.06	.28**
STMs have sound psychometric properties	.11	-.07	.33**	-.18	.33**
Use of STMs is facility expectation	-.10	.05	.12	.03	.23*

Table 28. Clinical Instructor Correlation Matrix: Individual Survey Items and Principal Component Factors (continued)

Use of STMs is reimbursement requirement	-.20*	.11	-.11	.05	.09
STMs are easy to use	-.10	.09	.10	-.00	.02
STMs are useful for variety of purposes	.03	-.09	.26**	.04	.31**

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
STM=Standardized Tests and Measures

Significant, moderate correlations (0.50-0.75) were identified between STM confidence change and change in STM value, and between value to the PT profession and clinical practice. Fair, significant correlations (0.250-0.50) were identified between value to the PT profession and change in frequency of STM use and change in reason for STM use, between value to clinical practice and change in frequency of STM use and change in reason for use, between STM change in frequency of use and change in STM confidence and change in reason for STM use and change in STM value, between change in STM confidence and change in reason for STM use, and between change in reason for STM use and change in STM value. Although significance was identified for change in reason for STM use and value to clinical practice, the correlation equivalent strength was low (0.00-0.25). No other statistically significant correlations were identified (Table 29).

Table 29. Clinical Instructor Correlation Matrix: Survey Responses

	Value to PT profession	**Value to clinical practice**	**STM use frequency change**	**STM confidence change**	**Change in STM reason to use**	**Change in STM value**
Value to PT profession	-					
Value to clinical practice	.60**	-				

Table 29. Clinical Instructor Correlation Matrix: Survey Responses (continued)

STM use frequency change	.28**	.42**	-			
STM confidence change	.37**	.34**	.40**	-		
Change in STM reason to use	.13	.21*	.32**	.42**	-	
Change in STM value	.17	.20*	.34**	.70**	.38**	-

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).; STM=Standardized Tests and Measures

Significant moderate correlations (0.50-0.75) were identified between value to clinical practice and STM utility and intrinsic regard. Significant, fair correlations (0.25-0.50) were identified between value to the PT profession and STM utility and intrinsic regard, between value to clinical practice and STM burden, change in frequency of STM use and intrinsic regard, between intrinsic regard and STM confidence change and STM value change. Significance was identified for change in frequency of STM use and STM burden and STM utility with low correlation equivalent strengths (0.00-0.25) (Table 30).

Table 30. Clinical Instructor Correlation Matrix: Survey Responses and Principal Component Factors

	STM Burden	**STM Ease of Use**	**STM Utility**	**STM Utility**	**Intrinsic Regard**
Value to PT profession	.14	.09	.48**	-.04	.38**
Value to clinical practice	.29**	.06	.55**	-.12	.51**
STM use frequency change	.21*	.02	.21*	-.10	.30**
STM confidence change	.05	.03	.19	-.10	.31**
Change in STM reason to use	.08	-.09	.16	-.13	.22*
Change in STM value	.12	.06	.17	.04	.24*

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed). ; STM=Standardized Tests and Measures

Binary logistic regression: use. A dichotomous variable was created related to categorize CI 'users' versus 'nonusers'. A CI was categorized as a 'user' if at least one STM was identified as being used in the survey section related to general practice area or population categories. Users represented 65% (n=74) of CI participants, with nonusers representing the remaining 35% (n=39). As described by Jette et al,[68] associations between the dependent variable of use and participant characteristics of APTA member status, ABPTS certification, gender, clinical focus area, clinical practice setting were evaluated. A binary logistic regression with a forward selection process (requiring $p<.05$ to enter and $p<.10$ to delete) was run, with no significant models identified. Exhaustive combinations of variables were also entered into the initial model and did not meet the threshold for significance. Odds ratios were not identified that met significance for reporting (Appendix 5).

Linear regression: value. Linear regression was performed, seeking to predict the value of the dependent variable, intrinsic regard; this factor, created in the prior PCA, represented intrinsic regard for the value of STMs. Four independent variables remained after 10 iterations in the regression equation: component factors (1) STM burden and (2) STM utility identified from the PCA performed on Q20, (3) Q24, confidence in using STMs, and (4) one of the sub-items from Q18 related to extrinsic drivers for STM use, i.e. mandated/required for all patients/clients. Either of the two related questions from Q18 could have been used, as they were very similar in output. A backwards exclusion algorithm (10 iterations, final model $F=15.682$, $p<0.0005$) led to a model that predicts 38.2% of the variance in Q18Intrin, and this is statistically significant at alpha of .05. All

independent variables that remained in the linear regression matrix were significantly associated with intrinsic regard.

Q24 (CI confidence in using STM) was positively associated (p=.017) with intrinsic regard, such that adjusting for the other variables in the model, for each additional unit of change in confidence, intrinsic regard was anticipated to increase by 0.20 and this association was significant. The STM burden factor was positively associated (p=.046) with intrinsic regard, such that adjusting for the other variables in the model, for each additional unit change/decline in STM burden, intrinsic regard was anticipated to increase by 0.17, and this association was significant. The STM utility factor was positively associated (p=.000) with intrinsic regard, such that adjusting for the other variables in the model, for each additional unit of change in STM utility, intrinsic regard was anticipated to increase by 0.44, and this association was significant. The Q18 item 'mandated/required for all patients/clients' was also positively associated (p=.007) with intrinsic, such that adjusting for the other variables in the model, for each additional unit of change in Q18j, i.e. agree more strongly that STMs are mandated, intrinsic regard was anticipated to increase by 0.23, and this association was significant (Table 31).

Table 31. Linear Regression: Prediction of Intrinsic Regard for Standardized Tests and Measures

	Unstandardized Coefficients		**Standardized Coefficients**			**95% Confidence Interval for *B***	
	B	Standard Error	*B*	***T***	*Sig*	Lower Bound	Upper Bound
(Constant)	-.81	.27		-3.00	.003	-1.34	-.27
CI Confidence Change	.40	.16	.20	2.43	.017	.07	.72
CI Q20	.16	.08	.17	2.02	.046	.003	.32

Table 31. Linear Regression: Prediction of Intrinsic Regard for Standardized Tests and Measures (continued)

C3 Q20	.45	.09	.44	5.23	.000	.28	.61
Q18 Mandatory -Pt	.53	.19	.23	2.76	.007	.15	.91

Dependent variable: Q18 Intrinsic component factor

Physical therapist student. ***Confidence:*** A Wilcoxon signed-ranks test, given the ordinal nature and non-normal distribution of this data, was utilized to compare the confidence in STM selection scores reported by all students from prior to the clinical experience to their confidence level near the end of the clinical experience. The Wilcoxon signed-rank test showed that pre-clinical to end of clinical self-assessment of confidence in selection of STM was demonstrative of a statistically significant change (Z= -7.965, p=.000). A Wilcoxon signed-rank test showed that PT students' pre-clinical to end of clinical self-assessment of confidence in administration of STMs was demonstrative of a statistically significant change (Z= -8.010, p=.000). A Wilcoxon signed-rank test showed that pre-clinical to end of clinical self-assessment of confidence in interpretation of STMs was also demonstrative of a statistically significant change (Z= -9.427, p=.000).

Delta scores were created for confidence in selection, administration and interpretation, representing change from prior to the clinical experience to the end of the clinical experience. The delta scores were incorporated into testing between characteristic groups, i.e. clinical focus area and clinical practice setting. A one-way ANOVA revealed that only the confidence in selection delta, ConfSelectDelta, was statistically significant (p=.024), indicating a difference in change in confidence by grouping, i.e. the primary clinical focus areas identified as 0=Acute Care, 7=Neurology, 9=Orthopedics, 10=Other. Further analysis with a Tukey HSD post hoc test (p=.015) revealed that those in acute

care (mean=0.38, SD=0.87) had significantly less change in STM selection confidence than those in neurology (mean=1.50, SD=0.5). No other differences were found between the groups on change in STM selection confidence by clinical focus area (Table 32-33).

Table 32. ANOVA Descriptives: Student Confidence Change by Clinical Focus Area

					95% Confidence Interval for Mean	
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
ConfSelect Delta	Acute	13	.38	.87	.24	-.14	.91
	Neurology	8	1.50	.53	.19	1.05	1.95
	Orthopedics	53	.96	.76	.10	.75	1.17
	Other	44	.93	.90	.14	.66	1.21
	Total	118	.92	.84	.08	.77	1.08
ConfAdmin Delta	Acute	13	.61	1.19	.33	-.11	1.34
	Neurology	8	1.00	.53	.19	.55	1.45
	Orthopedics	54	1.00	.93	.13	.75	1.25
	Other	44	1.14	.93	.14	.85	1.42
	Total	119	1.00	.94	.09	.84	1.18
ConfInterp Delta	Acute	13	.54	.66	.18	.14	.94
	Neurology	8	.75	.71	.25	.16	1.34
	Orthopedics	54	.74	.71	.10	.55	.93
	Other	42	1.00	.94	.14	.71	1.29
	Total	117	.81	.80	.07	.67	.96

ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta

Table 33. ANOVA Tests of Between Subjects Effects: Student Confidence Change by Clinical Focus Area

		Sum of Squares	Df	Mean Square	F	Sig.
ConfSelect Delta	Between Groups	6.51	3	2.17	3.267	.024
	Within Groups	75.80	114	.67		
	Total	82.31	117			
Conf AdminDelta	Between Groups	2.73	3	.91	1.024	.385
	Within Groups	102.26	115	.89		
	Total	104.99	118			

Table 33. ANOVA Tests of Between Subjects Effects: Student Confidence Change by Clinical Focus Area (continued)

ConfInterp Delta	Between Groups	2.76	3	.92	1.463	.228
	Within Groups	71.10	113	.63		
	Total	73.86	116			

ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta

A one-way ANOVA compared confidence deltas by clinical practice setting: (0) "other" representing all settings other than the 3 most heavily represented, (1) acute care, (2) health system/hospital-based outpatient facility/practice, and (3) private outpatient office/group practice. A significant difference (p=.004) was found between groups for the ConfSelectDelta. A Tukey HSD post hoc test (p=.005) revealed significant differences between acute care (mean=0.47, sd=0.8) and health system settings (1.29, sd=0.86), with students in acute care demonstrating less change in STM selection confidence than those in outpatient health system settings. A significant Tukey HSD post hoc test (p=.036) revealed that students in health system settings were different from those in private outpatient settings (mean=0.78, SD=0.76). Students in health system/hospital-based outpatient facility/practice had significantly more change in STM selection confidence than those in private outpatient office or group practices (Tables 34-35).

Table 34. ANOVA Descriptives: Student Confidence Change by Clinical Practice Setting

						95% Confidence Interval for Mean	
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
ConfSelect	Other	25	.96	.79	.16	.63	1.29
	Acute	17	.47	.80	.19	.06	.88
	HS OP	35	1.29	.86	.15	.99	1.58
	Private OP	41	.78	.76	.12	.54	1.02

Table 34. ANOVA Descriptives: Student Confidence Change by Clinical Practice Setting (continued)

ConfAdmin Delta	Total	118	.92	.84	.08	.77	1.08
	Other	25	1.08	.95	.19	.69	1.48
	Acute	17	.59	1.06	.26	.04	1.14
	HS OP	35	1.2	.91	.15	.92	1.54
	Private OP	42	.95	.88	.14	.68	1.23
ConfInterp Delta	Total	119	1.01	.94	.09	.84	1.18
	Other	25	.96	.98	.20	.57	1.36
	Acute	17	.59	.62	.15	.27	.91
	HS OP	34	.91	.87	.15	.61	1.21
	Private OP	41	.73	.67	.10	.52	.94
	Total	117	.81	.80	.07	.67	.96

ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta
OP=Outpatient; HS=Health System

Table 35. ANOVA Tests of Between Subjects Effects: Student Confidence Change by Clinical Practice Setting

		Sum of Squares	Df	Mean Square	F	Sig.
Conf Select Delta	Between Groups	8.95	3	2.98	4.64	.004
	Within Groups	73.36	114	.64		
	Total	82.31	117			
Conf Admin Delta	Between Groups	4.96	3	1.65	1.90	.134
	Within Groups	100.03	115	.87		
	Total	104.99	118			
Conf Interp Delta	Between Groups	2.00	3	.68	1.05	.374
	Within Groups	71.86	113	.64		
	Total	73.86	116			

ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta

Correlations. Statistically significant nonparametric correlations were found between many PT student demographic variables and survey question responses as illustrated in Tables 36-37. Results are split into multiple tables for better visual representation; *p* value is provided for statistically significant correlations only.

In Table 36, a significant, fair correlation (0.25-0.50) was identified between clinical focus area and ConInterpDelta. Although significance was reached for geographic region and personal STM value, and between current GPA and value of STM to the profession, the correlation equivalent strength was low (0.00-0.25). No other statistically significant correlations were identified.

Table 36. Physical Therapist Student Correlation Matrix: Relationships between Demographic Characteristics, Survey Responses and Confidence Change

	STM Value to Profession	STM Value to Practice	STM Personal Value	STM Use	ConfSelect Delta	ConfAdmin Delta	ConfInterp Delta
Clinical Practice Setting	.05	.03	.08	.03	.01	.03	.08
Geographic Region	.04	.00	.19*	.02	-.04	-.07	-.01
Clinical Focus	-.09	-.00	.03	-.13	.08	.15	.25**
Length of Clinical	-.01	.07	.16	-.12	.17	.14	.09
Current GPA	-.22*	-.16	.04	.00	-.01	.07	.05

GPA=Grade Point Average
**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the .05 level (2-tailed)
ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta

In Table 37, significant, moderate correlations (0.50-0.75) were identified between STM value to profession and clinical practice, between all confidence deltas. Significant, fair correlations (0.250-0.50) were found between STM value to profession and personal value, between STM value to practice and personal value and use, between personal value and use and the confidence deltas, and between use and the confidence deltas. No other statistically significant correlations were identified.

Table 37. Physical Therapist Student Correlation Matrix: Relationships between Survey Responses and Confidence Change

	STM Value to Profession	STM Value to Practice	STM Personal Value	STM Use	ConfSelect Delta	ConfAdmin Delta	ConfInterp Delta
STM Value to Profession	-						
STM Value to Practice	.56**	-					
STM Personal Value	.25**	.43**	-				
STM Use	.13	.49**	.49**	-			
ConfSelect Delta	.07	.17	.30**	.38**	-		
ConfAdmin Delta	-.07	.16	.25**	.26**	.59**	-	
ConfInterp Delta	-.07	.11	.35**	.30**	.51**	.67**	-

GPA=Grade Point Average STM=Standardized Tests and Measures
**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the .05 level (2-tailed)
ConfSelectDelta=Confidence in standardized measure selection delta
ConfAdminDelta=Confidence in standardized measure administration delta
ConfInterpDelta=Confidence in standardized measure interpretation delta

Clinical instructor- physical therapist between group analyses. Each group was asked questions in parallel related to the change in their perception of value (Q19 of PT Student Survey and Q26 of the CI Survey) and frequency of STM use (Q20 of PT Student Survey and Q23 of the CI Survey) during their clinical experience. The questions had the same scaling, worded only slightly differently to reflect group assignment, so could, therefore, be directly compared.

Value. Both groups were queried whether they valued the use of STMs less, the same, or more than they did before the clinical experience. PT students were significantly more likely to answer that their value increased after the clinical experience than their CIs. The Independent Samples Mann-Whitney *U* Test was significant with a $p < 0.005$.

Frequency of Use. The PT students were asked if they used STMs less, the same, or more than they anticipated during their clinical experience. The CIs were asked if their use was more frequent, with the same frequency, or less frequent than they did before the clinical experience. The Independent Samples Mann-Whitney *U* Test was not significant (p=0.118). It can be concluded that the PT students and CI participants were not different in their responses regarding frequency of STM use.

Clinical instructor-physical therapist student paired analyses. Twenty-five 'pairs' of PT students and CIs were identified; these were participants that had entered an identification code that matched with the code of a participant in the other group, i.e. their clinical partner. Dichotomous CI grouping variables were created for gender, APTA membership status, entry level degree, and the Q18 and Q20 PCA factors previously described. The continuous or quasi-continuous dependent variables deemed adequately robust to the assumptions for parametric testing in the PT student group were the delta scores for confidence in selection, administration, and interpretation and the value of STMs to the profession. Independent t-tests were performed. Equality of variance was assumed and verified by Levene's Test. The computed t-statistic (-2.132) for the Q18 Intrinsic factor score to PT student confidence in administration delta score just exceeded the critical value threshold to meet statistical significance of p=0.047. There was no significant difference in the other dependent variables evaluated based on the CI grouping variables (Appendix 5).

Although the 25 paired responses had the potential to provide meaningful information, additional parametric statistical analysis was not appropriate because of the small *n* and disparate groupings that presented with analysis, i.e. 20 individuals in one

group and only one or two in the other. This was especially problematic when looking at PT student variables (i.e. demographic, value, use or confidence characteristics) on CI dependent variables. Although Spearman's correlation coefficient is more robust to assumptions, the sample size and overwhelmingly unequal distribution between groups was not adequate and notably impacts the trustworthiness for analyses.[125] Due to these limitations, further analyses looking for correlation between student characteristics and CI variables of interest was not appropriate.[125]

Qualitative Results

The purpose of this mixed methods study was two-fold: (1) to examine clinical instructor (CI) and physical therapist (PT) student characteristics and beliefs that influence the use of STMs in clinical practice, and (2) explore the alignment or conflict between the STMs students learn during their academic preparation to those commonly reported in contemporary clinical practice. In order to best address the purpose of this study, survey methodology and semi-structured interviews were utilized.

The qualitative phase of this study provided a rich exploration of the research questions and also allowed for perspectives related to the more broadly encompassing topic of the lived experience of being a CI or student during a terminal clinical education experience. Data presented in this section elucidate the research purposes through the sharing of the expectations, benefits, and challenges participants experienced in their role as a CI or student. The methodology of the qualitative research process was discussed in Chapter Three.

This section of the chapter begins with a discussion of the participants' demographic information. Next, analysis of the semi-structured interviews is presented in terms of the emergent themes. Each of the themes and relevant subthemes, exemplars, and differences between groups are discussed. Finally, a summary of the qualitative data findings are provided.

Descriptive Data

Eight PT student and nine CIs participated in the qualitative phase of the research project. An equal gender mix of PT student participants was noted, with all participants identifying as white/non-Hispanic. Three-fourths of all students had an orthopedic clinical focus area on their terminal clinical experience, with half in private outpatient practice and the other half in a health system. Clinical length for all was between nine and 10 weeks in length (Table 38).

Only one CI participant was male and 88.9% identified as white/non-hispanic. More than half of the CI participants (55.6%) were APTA members practicing in the Middle Atlantic region and two reported they held ABPTS certifications. The CIs reported a range of years in practice of 1.5-35 years with a mean of 15.4 years of experience. Forty-four % of the CIs held an entry level DPT with an additional participant reporting completion of a transitional DPT. Practice setting and primary clinical focus area were mixed for the CI group (Table 39).

Table 38. Descriptive Data for Physical Therapist Student Participants

Physical Therapist Student (PTS)	Current Grade Point Average	Gender	Ethnicity Race	Primary Clinical Practice Setting	Length of clinical experience	Primary clinical focus area	Geographic region of practice
PTS Andy	3.76-4.0	M	NH/W	HS	9	Orthopedic	Middle Atlantic
PTS Carline	3.76-4.0	F	NH/W	HS	9	Pediatric	South Atlantic
PTS Jack	3.76-4.0	M	NH/W	Private OP	9	Geriatric	South Atlantic
PTS Tom	3.51-3.75	M	NH/W	HS	10	Orthopedic	Middle Atlantic
PTS Daphne	3.51-3.75	F	NH/W	Private OP	9	Orthopedic	South Atlantic
PTS Erica	----*	F	NH/W	Private OP	9	Orthopedic	South Atlantic
PTS John	3.51-3.75	M	NH/W	Private OP	9	Orthopedic	Middle Atlantic
PTS Susan	3.51-3.75	F	NH/W	HS	10	Orthopedic	Middle Atlantic

* Chose not to answer

OP=Outpatient; NH/W=Not Hispanic/White; HS=Health System tDPT=transitional doctor of physical therapy; BS=bachelor's degree; MS=master's degree; DPT= doctor of physical therapy; Y=Yes; N=No; NH/W=Not Hispanic/White; HS=Health System; SS=School System; IRF=Inpatient Rehabilitation Facility; SNF=Skilled Nursing Facility

Table 39. Descriptive Data for Clinical Instructor Participants

Clinical Instructor (CI)	Entry level degree/ Highest level degree	Years in practice	Gender	Ethnicity/ Race	APTA Member	ABPTS Certification	Primary Clinical Practice Setting	Years in current clinical practice setting	Primary clinical focus area	# of PT students /2 years	Geographic region of practice
CI Amber	DPT DPT	1.5	F	NH /W	Y	N	IRF	1.5	Neurology	1	Middle Atlantic
CI Betty	DPT DPT	8	F	NH /W	Y	Y	SNF	3	Geriatric	6	Middle Atlantic

Table 39. Descriptive Data for Clinical Instructor Participants (continued)

CI Cora	MS MS	35	F	NH /W	N	N	SS	29	Pediatric	4	Middle Atlantic
CI Doris	MS MS	22	F	NH /W	Y	N	HS	11	Pediatric	3	Pacific
CI Ed	MS tDPT	17	M	NH /W	Y	Y	HS	3	Neurology	3	New England
CI Fran	BS BS	25	F	NH /W	N	N	HS	9	Acute	4	Middle Atlantic
CI Gail	DPT DPT	7	F	NH /W	N	N	HS	7	Orthopedic	2	Middle Atlantic
CI Holly	DPT DPT	3	F	NH /W	Y	N	HS	2	Neurology	1	New England
CI Iris	BS BS	20	F	NH /W	N	N	SS	17	Pediatrics	5	Middle Atlantic

NH/W=Not Hispanic/White; HS=Health System; SS=School System; IRF=Inpatient Rehabilitation Facility; SNF=Skilled Nursing Facility

Domains, Themes and Subthemes

The analysis of each case was followed by within and across group analyses, yielding five themes and twelve subthemes. The themes were categorized into extrinsic and intrinsic domains with thematic categories (open codes) created to further organize the data. The three 'extrinsic' domain thematic categories encompassed (1) extra-organizational, (2) organizational, and (3) STM suitability factors. The 'intrinsic' domain included thematic categories related to (1) personal/professional identity and (2) the CI/PT student shared experience. A tabular representation of the thematic framework is presented in Table 40. Tables 41 and 42 provide information on the loading of themes and subthemes across CI and PT student cases. As noted in Chapter Three, thematic categories and subthemes were confirmed/supported by a peer reviewer, who also

provided support throughout analysis, focusing on strategies to minimize researcher bias and enhance reflexivity.

Table 40. Qualitative Data Display

Domain	**Thematic Category**	**Sub-theme**
Extrinsic Drivers	Extra-organizational factors: regulation and reimbursement	
	Organizational factors	Community of practice Autonomy in selection Resources and support
	Suitability	Clinical setting and patient population 'Value' equation
Intrinsic Drivers	Personal/professional identity	Impact of others Versatility/adaptability Self-efficacy/confidence in self Beliefs and biases
	Clinical instructor/Student shared experience	Mutual learning/growth Students as knowledge brokers Legacy/influence

Table 41. Theme and Sub-theme Loading Across Clinical Instructor Cases

Themes, Sub-themes	**CI Amber**	**CI Betty**	**CI Cora**	**CI Doris**	**CI Ed**	**CI Fran**	**CI Gail**	**CI Holly**	**CI Iris**
Extra-organizational: Regulation and Reimbursement	-	1	1	1	-	1	-	1	1
Organizational: Community of Practice	5	1	1	1	2	1	-	2	-
Organizational: Autonomy	1	2	2	-	2	2	1	1	1
Organizational: Resources and Support	-	1	-	1	2	1	-	2	-
Suitability: Clinical Setting and Patient Population	5	3	2	5	1	3	-	-	3
Suitability: Value Equation	4	2	2	1	1	1	3	1	1
Personal/Professional Identity: Impact of Others	2	-	2	-	-	1	1	1	1

Table 41. Theme and Sub-theme Loading Across Clinical Instructor Cases (continued)									
Personal/Professional Identity: Versatility and Adaptability	2	1	1	7	2	1	-	-	-
Personal/Professional Identity/Self-efficacy/confidence	1	1	1	7	-	2	1	1	-
Personal/Professional Identity: Beliefs and Biases	4	3	2	12	2	10	3	-	2
Clinical Instructor/Student Shared Experience: Mutual Learning/Growth	3	-	1	3	1	1	-	1	3
Clinical Instructor/Student Experience: Students as Knowledge Brokers	2	2	2	2	4	-	3	2	1
Clinical Instructor/Student Experience: Legacy/Influence	1	3	5	6	2	2	4	4	1

Table 42. Themes and Sub-theme Loading Across Physical Therapist Student Cases

Themes, Sub-themes	**PT Andy**	**PT Carline**	**PT Jack**	**PT Tom**	**PT Daphne**	**PT Erica**	**PT Susan**	**PT John**
Extra-organizational: Regulation and Reimbursement	2	2	1	2	1	2	2	2
Organizational: Community of Practice	2	-	1	-	-	-	1	-
Organizational: Autonomy	1	2	1	2	4	2	1	1
Organizational: Resources and Support	1	1	1	-	1	1	1	-
Suitability: Clinical Setting and Patient Population	-	3	2	2	5	2	3	2
Suitability: Value Equation	2	2	6	2	6	2	4	5
Personal/Professional Identity: Impact of Others	1	1	2	5	5	2	5	3
Personal/Professional Identity: Versatility and Adaptability	1	-	3	1	-	1	2	-
Personal/Professional Identity/Self-efficacy/confidence	1	-	4	2	-	1	2	1
Personal/Professional Identity: Beliefs and Biases	6	1	3	4	1	1	2	2
Clinical Instructor/Student Shared Experience: Mutual Learning/Growth	1	-	1	1	-	-	-	1
Clinical Instructor/Student Shared Experience: Students as Knowledge Brokers	-	2	1	1	2	1	-	1
Clinical Instructor/Student Shared Experience: Legacy/Influence	4	2	1	3	1	1	1	1

Theme one: extra-organizational regulation and reimbursement. Regulation and reimbursement emerged as a predominant theme; many participants discussed the impact of regulatory bodies such as Medicare on STM use. Although regulation and reimbursement are driven largely by extra-organizational influences associated with entities and expectations that derive from outside of the healthcare organization/practice setting that the CI is employed by or the PT student was assigned to for a terminal clinical experience, participants discussed how closely interwoven these extrinsic drivers were on organizational policies and procedures created to ensure compliance with the use of STMs. As one student (PTS Andy) indicated,

> *I think my CIs, they didn't rely as strongly, at least I felt, on them [STMs], it was more of a formality using those outcome measures… it was a requirement from someone above them or an accrediting body that wanted to see some sort of formal measure. Had that not been in place I'm not sure how many would actually go to it.*

As a CI in an outpatient pediatric environment relayed, "I'm getting more and more, you know, I get calls from insurers - too much - every week, really, going "yes, we will approve your therapy visits but why didn't you include any standardized testing in here?" Her frustration, as with others, was also associated with elements identified in the theme of suitability, to be described later in this section.

A number of CI and student participants discussed regulatory body influences on clinical education as well, indicating that Medicare Part B impacted the level of independence students were given and the challenge to maintain productivity while providing the level of supervision/support required. According to CI Cora,

> *The fact that there are certain insurances such as worker's comp where you can't – sometimes even Medicare part B that you can't - have students bill for…is really hard because depending on where I'm assigned within this large rehab*

center that I am in, that could be the majority of my patients. Yeah, that's definitely difficult sort of from a regulatory insurance perspective.

Theme two: organizational factors. Numerous factors directly associated with the healthcare entity/practice setting that the CI was employed by or the PT student was assigned to for a terminal clinical experience were reflected in the data. These factors encompassed explicit or implied values and norms related to (1) the prioritization of STMs, i.e. the degree of importance placed on the use of STMs by the organization or (2) involvement in clinical education as a CI. All organizational subthemes were closely interrelated.

Community of Practice. The subtheme of 'community of practice' emerged from participants, describing collective norms and expectations that individuals within their organization align with and are accepted by their peers based on engagement in behaviors consistent with these norms and expectations. Statements aligning with the concept of 'it's just what we do here' were often relayed by CIs. These collective norms were related to both clinical education, in general, and STMs, more specifically. Participants that described a strong connection with a community of practice expectation to use STMs, also had statements that loaded strongly on the organizational themes of 'autonomy in selection' and 'resources and support'. As CI Holly noted: "There has been a work group here that has really dove into the research to see what outcome measures have the most validity and reliability in the stroke population and so if we have patients who have some sort of stroke history then we go off of that toolbox." She indicates this toolbox is integrated into their electronic medical record, into their training, and their access to resources needed to administer the tests and measures their team has identified as best for their organization. Students spoke of this, alluding to differences in expectations and

practice across clinical experiences, and how they aligned their actions and behaviors accordingly, even when not fully consistent with how they planned to practice in the future.

Most participants also spoke broadly of the "profession" of physical therapy or the APTA, as the recognized professional organization, serving as a driver for their use of STMs. CIs and students expressed a desire to align with professional expectations, the ultimate PT community of practice, for STM use as an element of evidence-based practice because:

> *The general position of our field of practice is evidence-based…you know, when I went to school, I graduated in 1983, and we were at that time still using a lot of very generalized statements to indicate progress like 'minimal assistance' and 'maximal assistance' and 'progressing' and 'improving' and I remember very specifically not having to - maybe it would have been best practice at that time, too - but not having to quantify and over time that requirement either by insurance companies or by our administration or even by our research you know in order to be valid and to be quantified… so I think, like, in the profession there is a push to do that - and not just in our profession but medically - so that we can kind of stand at the same level of some of the other medical professions, show the quality of our work, really having to show quantification…it is important.* (CI Betty)

Autonomy. The degree of freedom/choice the organization allows related to the selection and/or use of STM in practice was discussed by both groups. Autonomy in selecting the test or measure that was most appropriate for the patient was expressed as important to CIs but many reported appreciation for a refined list of commonly used tools to be built into their documentation system to choose from, with resources such as scoring sheets and norms made readily available for the few that their organization preferred. According to CI Cora, "there are certain ones that they give us in part of it, that drop-down box within our evaluation, but there is also sort of a free-form area as well. So as long as one of those areas is filled out my boss, the organization, as far as I've seen

insurance, doesn't care which one we choose it really truly could be anything." Another CI concurred, noting "The organization doesn't mandate per se. They strongly suggest that we pick tools out of that [tool box] but you know we still have the freedom to choose other appropriate tools based on the situation." Most students expressed that their CIs were willing to let them use STMs they wanted, as long as appropriate for the setting or population; however, many students expressed being locked in to requisite use of a few STMs identified by the clinical site to be used for all patients with certain diagnoses, conditions or reimbursement sources. Most students felt their CIs defaulted to the mandated or 'recommended' tests and measures for their practice, often not identifying and using others that may be more appropriate. As PTS Gail indicated,

> *"They used the TUG with everybody who has Medicare. We did use Berg Balance for one individual who was on Medicare but was pretty high level. We used the Tinetti, too, a couple of times….basically those three. They used the LEFS, the Oswestry and stuff like that every time with everybody [with certain diagnoses]."*

Resources and Support. The theme of 'resources and support' was operationally defined as the support, aid, budget, or supplies made available by the organization and that are perceived as supporting or hindering the use of STMs. Elements that were discussed by many CIs and students related to workload, time, accessibility, and knowledge. Participants indicated that using STMs required dedicated time allocated by the organization to administer or interpret STMs or to find and learn new STMs. The concept of accessibility encompassed the ease with which STMs were obtained or used, i.e. built into the EMR, printed and available in department, and for equipment/supply set up. Electronic medical records that had STMs integrated into the system, allowing for ease in scoring and interpretation were perceived as valuable. Clinical instructors reported that acquisition of knowledge and confidence in using STMs occurred primarily

through in-house training or from students bringing new knowledge to the clinic. A CI working in an IRF, indicated; “The facility that I work at has been great about investing in educational experiences for us.” (CI Amber) Another CI linked this with autonomy, indicating: “So we are taught them, we are instructed to use numerical measures, to use very specific objective measures, to quantify progress and then we are left to our own devices to figure out what really applies better for the particular child that we were working with.” (CI Betty) Students talked often about documentation and how they, too, found they relied on the built in tests and measures as they focused on building their efficiency on their final clinical experiences. As PTS Daphne noted,

> *There's definitely a preference for…the NDI or the DASH or the Oswestry, the LEFS…just because they were kind of all printed out but if you wanted anything you definitely could have printed it out or whatever if you wanted instructions for like the Berg or the DGI. It's just easier because some documentation systems have some of those built in which is nice.*

This theme also encompasses the organizational resources and support that facilitate or hinder involvement in clinical education. A pediatric CI reported that time to support a student on a clinical experience was acknowledged by the organization: “Yes, we usually have at least one hour per day blocked off where we can review things that need to be reviewed and stuff like that.” This was one of the more dissonant areas for the CIs, with some feeling adequate time for one-on-one support and to meet productivity expectations were, at times, in conflict. Students alluded to productivity expectations impacting quality of patient care but few discussed the impact on their learning.

Theme three: suitability. The theme of suitability represents the determination made as to whether STMs are suitable or appropriate (1) under different contexts/conditions such as patient, population or setting, and/or (2) to meet designated

purposes as part of the patient/client management process such as communication with other providers, to evaluate outcomes, or establish a plan of care. Participants were vocal about this, with every participant expressing an opinion about the 'value' equation they consider with STMs. Concerns and frustrations were expressed by many about the lack of appropriate tools for specific patient populations and unique practice settings. As one school-based pediatric CI indicated,

> *Some of the problems that I have had with normalized data is that it doesn't always apply to my population…We are in situation sometimes where a child can walk and run but they have a very quote unquote funky quality of movement and we know there are some underlying motor planning, coordination deficits… then it is hard to find a test that will really pinpoint the deficit. Tests don't really test subtleties!* (CI Betty)

A number of students discussed the challenge with STMs in pediatric settings, with PTS Eric stating "In pediatrics because the score mandates a lot of things, I will have to do them but if I could choose not to I would choose not to use the standardized tests…because there is no standardized test that fits for kids with multiple problems."

Population-specific concerns were expressed by most participants, students and CIs alike, in pediatric environments and many in inpatient rehabilitation facilities, but seldom noted by those identifying as practicing in outpatient orthopedics. Functional relevance and ease – for both administration and to reduce the cognitive/physical demand on patients/clients – were important in the 'value' equation for participants that worked in pediatrics, acute care, and inpatient and subacute rehabilitation settings. One acute care CI indicated:

> *I would say the one that gives me the most 'bang for the buck' and the reason I say that is I do strictly acute care. My people do not tolerate very much so I'm not going to totally poop them out by doing some extensive tests and then get nothing functional done that day… I know they have to climb stairs to go home tomorrow*

and I'm going to see how far they can walk…you know we focus on the function first and if there's time left over I think it's great to get some standardized measures to prove that they're making gains.

According to CI Cora, working in a skilled nursing setting, a suitable STM is:

the kind of thing that I could do off the top of my head, I didn't need a scoring sheet…The Boston University 6 click is also fairly new, is another great one especially for lower level patients because it really includes bed mobility and that sort of thing…versus most of the others that we learn in school, you know, you have to be ambulatory for.

According to most of the respondents, there is a need for both norm and criterion-referenced tools to choose from to fully address their patient/clients' needs. Approximately half of the CI participants indicated that finding the right tools to meet these, at times, divergent needs can be difficult. Some indicated this was because there were not enough tests and measures out there for their patient/client population and others felt the many options for their patients made this process overwhelming at times. As PTS Jack articulated,

I think they [STMs] are valuable to PT practice for sure. I think there's a lot of them out there - there's almost too many of them out there to narrow them down specifically - so I have noticed each clinic I go to they have a few. They have one or two for balance, they have one or two for ADLs or mobility or whatever and those are the kind of ones they stick to because they are the ones they are most familiar with.

Participants from outpatient settings almost unanimously reported that time, space, and/or ease to administer and interpret STMs were much more important considerations for their practice. An outpatient therapist (CI Holly) stated:

So time is definitely a big part of it…today I had an evaluation that was running long but I still had to do a balance test so I chose something quick like the Foursquare step test. Sometime the availability of space if we're doing the functional gait and there's people on both hallways I won't do it then. That's probably the two things – time and space.

Although not perceived to be as 'valid' as performance-based measures by a few participants, self-report outcome measures like the DASH and LEFS were reported as commonly used in outpatient settings. As participants indicated, these self-report measures are accepted by insurance companies and save clinician time during busy evaluation and treatment sessions, sometimes being chosen over performance-based measures for these reasons. As PTS Erica relayed, "I think for reimbursement, they always had them fill out a questionnaire which would suffice for what they needed for insurance… it was a policy that every single evaluation must get an outcome measure to fill out with their forms."

Theme four: personal/professional identity. As one of the themes in the intrinsic domain, personal/professional identity was operationally defined as the intrinsic factors that help define one's self concept and may be based on attributes, beliefs, values, motives, and experiences. Impact of others, versatility/adaptability, self-efficacy/confidence, and beliefs and biases presented as subthemes.

Impact of others. Participants across both groups indicated that others influenced the clinician they were or were becoming, having an impact on their professional identity. Students and CIs alike felt prior CIs were pivotal in their development as a clinician. Many CIs talked about how the CI they are was modeled after CIs they had during their time as a student. One CI relayed this well, stating "I was very lucky I had really, really positive clinical experiences and worked with CIs who were really practicing at the top of their license and you know really worked hard to maintain best practice." She continued with specific praise for one of her CIs, "I feel like I have her in my head always with everything I do and then some of the, you know, it was like she would give me feedback

and sort of the way she would challenge me. I find myself bringing those back into my practice now and really trying to still use those skills that she gave me." Participants that strongly asserted that a mentor challenged them to practice 'at the top of their game', were also more positive in their discussion about incorporating evidence-based practice and STMs into their current or future practice. As PTS Erica indicated,

> *There were some clinicals where I thought evidence-based practice wasn't as heavily enforced…it just wasn't used…I definitely had the other side of it where my clinical instructor came in and "Oh, I just totally read this article last night and its actually saying that this change in this exercise actually makes it way more effective"…it was definitely much more evidence-based practice.*

Students primarily discussed the value of positive role models but a number of students and CIs acknowledged that a less than optimal clinical experience gave them insight into what was important to them – the type of clinician or future clinical instructor they did *not* want to be. A CI (CI Cora) supported this with "I had, when I was in school, a couple of really amazing CIs and a couple - one particularly - really horrific CI. I realized how much it really changed my view of PT. It really put me on a particular path in terms of what kind of PT I wanted to practice." A student (PTS Susan) expressed the following,

> *If the clinician doesn't want a student, they should not have a student. I think that should be respected from both ends. It's very hard to learn from someone who doesn't want to teach… everyone says if you don't go through at least one bad clinical experience you haven't had a real clinical experience so it was a learning curve for everyone involved and there are many ways that I could have probably tried to fix the situation and I ended up just going with the flow and couldn't wait for it to be over.*

Versatility/Adaptability. An emergent subtheme was the ability of the individual to be adaptable, flexible or resilient in clinical practice/teaching and/or learning. Individualization of learning experiences and an adaptable clinical teaching style and

feedback approach were hallmarks of this. CIs felt their best students also had these traits, demonstrating an ability to jump in to new experiences, be actively engaged in their learning, and willing to challenge themselves even if it meant being vulnerable to failure. This was expressed well by CI Doris, who indicated:

> *They have resilience, the students that make the best students are the students that have resilience and they're not afraid of to fail. I mean I think that is, you know, one of the biggest challenges…PT students, I mean PTs in general, I think we're all achievers and you're used to achieving and the ones that are the strongest students in my program are the ones that come in and say "nope, let me go get my hands dirty.* (CI Doris)

This CI asserted quite strongly that she was observing more and more a *lack* of versatility, adaptability, and self-efficacy in students over the course of her 22-year career. She attributed much of this to interpersonal skills and that these translatable skills come from working summer jobs in retail or food services, learning to deal with challenging customers, addressing conflict and prioritization of competing demands.

Students who demonstrated traits of versatility/adaptability discussed it primarily in regards to resolving dissonance when it presented between classroom and clinical expectations and between different clinical experiences, practice settings, and clinical instructors. Documentation requirements and volume of patients were cited by many students as areas they felt were notable different than what they expected, although most expressed they knew there would be a 'learning curve' and that there would be new things they would be exposed to and differences in clinical approaches. As PTS2 Carline indicated,

> *Getting used to different documentation systems was definitely a challenge during each clinical because what we learn during school…based on the ICF model, knowing diagnosis, prognosis, assessment statements - objective statements like that - and then being able to apply them into the different computer systems and*

getting used to have different CIs approach it and kind of being more concise than in school where we kind of learn to elaborate so much and to share our knowledge more academically…to put it into more concise words and be very specific with things in the clinical setting is totally different.

Self-efficacy/confidence. Confidence in the personal ability to competently execute behaviors was articulated by CIs and students and was evident in their expression of willingness to adhere to evidence-based practice and quality clinical instruction, even when faced with organizational and extra-organizational barriers. The CIs, even those that were novice, reported that working with a student was a positive boost to their sense of confidence and perceived competence as a CI and/or as a clinician. Those CIs with high levels of self-confidence appeared to be more willing to participate in collaborative learning with their student and indicated they had enough confidence in themselves to acknowledge that students kept them on their "A game" and that they were good clinicians and clinical instructors. CI Gail describes,

I think it [my confidence] has evolved from my first student. There's always a little bit of a learning curve and a little nerves and I think with years of experience -you know, practicing for 7 years now - I think, for me, I've grown as a clinician but also as a CI, definitely. In the beginning, it was, you know, just a little bit more challenging, just trying to figure out exactly what should I have the patient or the student do.

Having a level of self-confidence going into clinical experiences was reported as important by more than half of the students, with PTS Daphne describing this as:

…just being able to be confident from the get-go. I think that's always a big thing when you're changing your environment you just have to come in and act confident. You might not know everything but if the patient believes you and feels that you're confident, they will be more willing to participate and have confidence in you and build that rapport so I think just coming into a new situation and just trying to be as confident as you can and learn as much as you can.

Confident students reported staying true to themselves when they were in less than optimal clinical experiences, not compromising what they felt was important for evidence-based patient care or ethical practice.

Students also felt the building of self-confidence was perhaps the most notable benefit of clinical education. As PTS Jack stated,

> *I think, generally, clinical makes you feel pretty comfortable with who you are, if you have good CIs who reassure you that what you're doing is safe and adequate. I think there is always a general worry of what if you don't know something that walks through the door or what if you don't or aren't sure whether you can or can't do that I think that's just a general worry and that's going to come with experience.*

Another (PTS Tom) indicated, "In my first…acute care I really gained the confidence in myself as a person and interacting with patients and knowing that I have the skill set."

Beliefs and biases. The subtheme of beliefs and biases is defined as the reflections or judgments made about a group, not an individual, as to social characteristics, personality, ability or performance. This subtheme was often linked with other themes/subthemes as commonly identified traits and behaviors amongst students and clinicians were related by participants. Also included in this subtheme were the individually held perceptions and beliefs about clinical education or STMs in general.

Some of the commonly supported beliefs expressed were about EBP and STMs. Students felt that most of their CIs demonstrated a commitment to continuing education and a willingness to be open to the ideas and knowledge their students brought to the clinic. Most CIs and students indicated that they felt that younger CIs, as a whole, tended to use STMs with more regularity than those with more experience. Students indicated that although many of their CIs defaulted to using only a few STMs, STMs

were used and valuable in the aforementioned practice settings. “They all seem to be pretty set in what their flows are, in what they're doing. I would do a couple more [STMs] and they would be like “that's great” but they probably wouldn't have looked at it anyway based on their clinical experience.” (PTS Andy)

The CIs in pediatrics, skilled nursing, inpatient rehabilitation, and outpatient environments felt students were well prepared to select, administer, and interpret STMs. As an experienced pediatric CI stated,

> *They come well prepared…I have not ever had a student that didn’t have a good foundation on just a plethora of tests and measures. We talk about some of the ones they used in geriatric settings that we use in pediatrics. Of course our normative values are different but it is the same test. It has been interesting and I think they do, at least the students that I have had, have a very clear understanding of why they are important.* (CI Betty)

This was not consistent with the response from the CI identifying as practicing primarily in acute care, who stated “I know it [use of STMs] is a huge emphasis and it is critically important in the outside world with insurance companies. We tend to do a lot more of it in outpatient and it is in the templates, all the more ortho kind of tests - you know those are everywhere - but on inpatient, on acute care, I have not had a single student suggest to me that we do one.” (CI Fran) Although this view was only relayed by one CI, students largely supported this view, indicating that they did not see the acute care therapists they worked with routinely using or valuing STMs either.

Approximately half of the CIs indicated that many of the academic programs they partnered with required all students to complete clinical experiences in identified practice settings or with specific populations, such as pediatrics and skilled nursing. CIs in these settings indicated they were more likely to have students that were not motivated, simply

going through the motions to complete a requisite experience with a population or setting they have no desire to work with or in. Other beliefs about student preparation and ability were not consistently held. One CI indicated that, in general, students demonstrate deficits in clinical reasoning. Two CIs expressed that there are generational differences, with professionalism and interpersonal skills requiring more support in recent years than in the past. About 1/3 of students felt gaining respect and credibility with patients was challenging because of being seen as young. A few students relayed that patients and other healthcare professionals had a poor understanding of the level of education and training required to become a PT which contributed to the challenge of gaining respect during their clinical experiences.

Theme five: clinical instructor/student shared experience. The connection or relationship between the CI and PT student during a clinical experience presented as an important theme, with participants describing mutual learning and growth from these relationships and that students serve a valuable role as knowledge brokers. An impact, a lasting influence, on their clinical partner was perceived as meaningful, both personally and professionally fulfilling.

Mutual Learning/Growth. Mutual learning and growth was operationally defined as both clinical partners actively learning and benefitting from the other, i.e. learning as "a two way street" (CI Amber). The CIs described professional growth and development from their engagement in clinical education; both novice and experienced CIs described growth not only in their ability as clinical educators, but growth in their communication and feedback with patients, patience, and creativity in treatment. Staying evidence-based and current, avoiding getting stale and complacent, were seen as significant benefits that

came from this collaborative learning. An experienced CI (CI Doris) described how watching her students treat provided her valuable perspective on her own treatment decisions. As CI Fran described, "I think it [taking students] is good because it keeps me on my toes. You know sometimes students come at things differently and they have learned something different or maybe they are struggling. I have to look at critically at how I am explaining things. I think that it helps me be a better clinician overall." As part of these sentiments, many CIs described collaborative research projects to identify the best evidence-based patient care for challenging or complex cases as a positive way they actively sought to learn with their student. A novice CI (CI Amber) indicated she learned this process from a CI mentor and carried it forward to her first student,

> *I think some of the stuff she brought forward to me was really interesting and certainly it is challenging to stay up on the current evidence. It is impossible to read everything and so it was really nice that she would bring things forward and I could share the articles that I read and that I am familiar with and that would help engage her in a really nice conversation and I think ultimately improve patient care. That was a nice take away.*

Students expressed similar sentiments and respect for the collaborative process many of their CIs engaged in with them; teaching and learning evolved over these final clinical experiences into a more collegial and less hierarchical exchange.

Students as Knowledge Brokers. Students were perceived as intermediaries, linking knowledge from the classroom to the clinic. CIs indicated this was not only new knowledge but also reinforcement of foundational knowledge, the 'basics'. As CI Amber related,

> *I think [taking students] brought me back to some of my basics. When you are specialized or practicing in a specialized area for a long time I think it becomes easier to forget some of these foundational things that you learned and… you have just been out of the habit of doing them sometimes and so students come in with that fresh and really broad perspective without having any real specialty*

experience. I think I definitely took some of those as lessons that I could apply more often.

Students were seen as valuable resources for contemporary techniques and approaches based on current research, with many CIs indicating that they actively solicited this from their students. According to CI Cora, "All the new knowledge, all the new research, all the new treatment ideas. I think that's the best… I definitely go to continuing education courses but still it's not always enough and so I think that is what I get most from the students. So, "okay, guys what is in the research, what are they saying? What are we supposed to be doing these days?"" Eight of the CIs indicated that students brought them information about STMs they had been previously unfamiliar with. Students concurred, feeling that they had good exposure to tests and measures in their academic preparation; all but one student indicated they showed their CIs at least one new test or measure during their clinical experience. Responses were mixed, however, as to whether the students felt their CIs would continue to use these new tests and measures after the clinical experience.

Legacy/Influence. Another important aspect described by participants as part of clinical instructor/student shared experience was related to the role as mentor and/or of the impact or influence participants felt they had on their clinical partner. For CIs, the sense of giving back to others and the profession was meaningful. CI Betty described this as 'planting a seed' with this generation of future PTs. She expressed,

This knowledge has taken me years to put together and I can pass it on. I feel like there are some things that we have had to develop in our setting specifically that I certainly didn't get in PT school... I feel that by giving them the combination of clinical experience and what I know and have learned in 30 years and how it all comes together, I feel like I am planting a seed by bringing it forward.

Many CIs expressed pride in prior students contacting them to say how what they learned during their clinical experience was meaningful, guided their career path, and was impactful. The contact with prior students as coworkers, as colleagues, filled CI Cora with 'a real sense of pride and joy' in being part of the journey from student to clinician. CIs also indicated a desire to leave a lasting appreciation with their students about the environment and patients they worked with during a clinical experience, to share some of their passion, regardless of the setting the student eventually will practice in.

Most students reported feeling they did impact the way their CI practiced, although many were unsure as to whether these changes were lasting or not. As PTS Andy related, "I think in some of those instances where someone may have just fallen into a complete rut where they are just doing the same thing every day, day in and day out, to have a student could kind of revamp things, where they're bringing in new techniques, bringing in new educational pieces." A few students indicated that the way their CI interacted and communicated with future students and patients could be credited to their legacy. As PTS Erica expressed,

> *On my last clinical my CI wasn't super into patient education necessarily and so... on my initial CPI [we discussed] how much time I spend with a patient just educating them…as I was leaving, during my final CPI, she said "yeah I really want to focus more [on patient education]…I see the patients aren't dropping off as they would." She was like "I definitely want to work on educating my patient more and using diagrams, models and stuff like that. I really liked how you did that."*

Summary of Quantitative and Qualitative Results

Numerous significant fair to moderate correlations were found between constructs of value, use, confidence, attitudes, and beliefs for both groups. There were statistically significant differences in STM value change between CIs and PT students. A significant

change in student confidence in STM selection, administration, and interpretation occurred over the CE, with additional differences found by clinical focus area (acute versus neurological focus). Differences were found in student change in STM selection confidence by clinical practice setting (acute care, health system outpatient practice, and private outpatient practice). The number of students supervised and APTA member status were found to be correlated with CI value and use constructs. Significant, fair correlations presented between extrinsic and intrinsic drivers to use STMs. A number of factors were found to significantly predict CI intrinsic regard of SMs; these were mandatory requirement to use SMs, change in STM confidence, STM burden, and STM utility. The qualitative data demonstrated five primary themes and twelve subthemes. These themes were overall consistent across both groups; the CIs expressed a stronger sense of appreciation for the mutual learning created during clinical experiences and a firmer belief in their lasting impact on students and their future practice. Students voiced a clear sense of appreciation for clinicians that challenge them and guide the process of coming into their own, developing into confident and independent clinicians. The overall perception of STM value to the profession was high; however, both groups indicated variability in STM suitability and applicability based on practice setting and patient population. Although both groups indicated that students brought new knowledge to the clinic in the form of novel STMs, neither group asserted definitively that this led to lasting change in practice as a result.

CHAPTER 5: DISCUSSION

Introduction

The primary purpose of this sequential explanatory mixed methods study was to examine clinical instructor (CI) and physical therapist (PT) student characteristics, attitudes, and beliefs that influence the use of STMs in clinical practice. A secondary purpose was to explore the alignment or conflict between the STMs students learn during their academic preparation to those commonly reported in contemporary clinical practice. In order to address the purpose of this study, several research questions were addressed through survey methodology and semi-structured interviews. The variables explored encompassed participant demographic characteristics and attitudes/beliefs, use/knowledge, confidence, and value associated with STMs.

The purpose of this chapter is to integrate the quantitative and qualitative findings, compare the findings to prior research, provide recommendations for future research, and discuss the implications of findings on clinical practice and education. The dissertation results are discussed through the lens of current literature on integration of EBP/STMs into PT practice and the influence of clinical education on EBP/STM use. Limitations and delimitations of the study are addressed.

Discussion and Interpretation of Results

Confidence

Physical Therapist Students. Approximately one third of PT students reported they were confident or very confident in the selection, administration, and interpretation of STMs prior to their CE. Prior research indicates that students with high levels of self-confidence going into the clinical environment are more likely to use EBP with their

patients, regardless of CI patterns of use.[56] This study found similar findings regarding the use of STMs as well. By the end of the CE, approximately 80% of PT students indicated confidence in selection, administration, and interpretation. This change in confidence was statistically significant for all aspects measured. Significant fair association was noted between student survey responses indicating they used STMs more than they anticipated and change in STM confidence across these three domains. Significant fair associations were also found to exist between confidence change and students' ratings of value in the use of STMs. Interviewed students described the opportunity to practice in the 'real world' under the guidance of a CI as critical to developing confidence in their abilities, indicating that time spent in the clinic was integral to their learning. This situated learning, when it occurs in a positive community of practice, has been found to have a lasting impact on confidence and future practice behaviors.[84]

Prior research substantiated that although confidence and knowledge of EBP improve in through classroom instruction, students do not engage in EBP in the clinic.[17,33,62,63] This is in contrast to the findings from this study, where use and confidence in STM use in the clinic coincided. These findings are aligned with past research that demonstrates EBP behaviors change when EBP education occurs across both the didactic and clinical components of the curriculum.[34,64] Greater change in STM confidence and higher levels of perceived positive value and use after a clinical experience is also consistent with literature that indicates self-confidence and attitudinal and behavioral change are closely connected.[72,126,127]

Student change in STM selection, administration, and interpretation confidence were compared across clinical practice settings and primary clinical focus areas. The ConfSelectDelta, as a representation of change in student confidence in selection of STMs over their clinical experience, was the only aspect of confidence change found to be significantly impacted by clinical focus area and clinical practice setting. As selection of STMs may be inferred to require greater clinical decision-making skill and practice than the 'mechanics' of following the instructions for STM administration or interpretation, the practical learning opportunities afforded by a clinical experience may be more influential on skill acquisition and confidence in selection of appropriate STMs for individual patients. Self-confidence has been found to be a strong predictor of not only academic performance but clinical competence as well.[126-128] Although this study did not follow students into their licensed clinical practice, it would be interesting to determine if there was carryover into practice.

Interestingly, student PTs on a CE with an acute care focus were found to have significantly less change in confidence in STM selection than their counterparts with a neurological focus, with more than a one point difference in mean change between groups. Student change in STM selection confidence in the acute care practice setting was also significantly lower than that of students in health system or hospital-based outpatient facility or practice. Qualitative analysis revealed that acute care CIs and students alike indicated a lower frequency of use and less focus on STMs in practice. Students and CIs reported there were fewer suitable STMs for the acute care environment and that they felt less pressure to routinely use STMs for reimbursement. Similarly, Jette et al[68] found that acute care therapists were 7 times less likely to use STMs than those in

outpatient settings.[68] Students are influenced by their CIs;[26,34,38,72] without practice using STMs, confidence is unlikely to change.

The qualitative findings from this study are consistent with these results as well. Students in outpatient orthopedic settings and neurologic-focused environments (skilled nursing and inpatient rehabilitation), indicated they were well prepared and confident in their use of STMs. Students indicated there were many STMs suitable and appropriate to choose from for these settings and for commonly seen diagnoses. The outpatient setting was overwhelmingly associated with the heaviest use of STMs, with the greatest organizational and extra-organizational expectations to use STMs with every patient/client. This is consistent with the use reporting found by general practice area and population in this study and the related body of literature.[8,68] This is addressed more fully later in this chapter. The correlation between greater use of STMs in settings where regulatory and payor constraints more heavily impact reimbursement, [8,68,69] i.e. PT outpatient versus acute care environments, and greater STM confidence change is consistent with social cognitive theory. Self-efficacy, or confidence, is developed from successful enactive mastery experience; an opportunity to practice and master challenging skills is necessary for confidence development.[24,79]

Students in health system or hospital-based outpatient practice settings had more change in STM selection confidence than those in private outpatient office or group practices. Participants in the qualitative phase did not specifically discuss differences by type of outpatient setting. The confidence change differences between private outpatient and health system outpatient facilities may be attributed to employer-established productivity standards. As productivity expectations in the private practice setting are

often higher, students may have less time to consider the individual merits of one STM over the other and may default to those that are readily integrated into an EMR or expected for certain patient diagnoses or populations. This may negatively impact change in confidence in selection of STMs.

Findings in the nursing literature are mixed with no clear consensus as to whether self-confidence wanes or increases over the course of the curriculum.[128] The 'stress' from the practical assessment of clinical competence that occurs during CEs, typically occurring later in the curriculum, has been theorized as a reason for the wane in confidence during health science education.[29,128] A supportive learning environment, positive and collegial CI-student relationships, and the opportunity to 'become my own clinician' were cited by all students as important aspects of confidence development and additionally substantiated by the finding that student confidence in STM administration was significantly associated with positive CI attitudes and beliefs about STMs.

Clinical instructors. This study is the first to explicitly explore change in STM confidence, use, and value that CIs directly attribute to a PT student/clinical experience. Although the majority (75.9%) of CIs reported no change in their confidence in using STMs based on their current PT student's CE, 20.7% indicated greater confidence, with only 3.4% reporting a decline. Unlike the student group, no personal or practice demographics correlated with STM confidence change. Moderate positive correlations *were* found between change in confidence and the perception of STM value to self, the profession, and to their clinical practice. Strong positive associations extended to all measures of change, i.e. STM value, reason for use, and confidence, by the end of the

clinical experience. Higher ratings of change in confidence were also positively associated with the Q18Intrinsic factor, a composite of positively-oriented STM attitudes.

Correlation does not indicate a cause-effect relationship between these variables; hence, we are unable to assert if confidence change, reported as impacted by a CE, preceded or followed associated changes in use and value of SMs. The findings are, however, aligned with studies that have found that personal confidence, or self-efficacy, is strongly associated with work-related performance.[56,79] Based on the qualitative data, the majority of CIs indicated that students kept them on their 'A-game' and more fully engaged in EBP during the clinical experience. This could explain the change in confidence in 20% of the CIs in this study. The findings of this study are also consistent with theoretical frameworks indicating that self-efficacy, self-regulation, and motivation are necessary for successful behavioral change.[44,75,77] The CIs interviewed expressed an understanding that, as CIs, they were important role models with influence on how these future clinicians may practice. All expressed motivation to model a high standard of practice and confidence in their abilities to do so.

Value, Attitudes, and Beliefs

The majority of both students and CIs indicated STMs were valuable to the PT profession and their clinical practice. Approximately 40% of students and 16% of CIs valued STMs more than they did before the CE, with very few indicating a decrease in STM value. A significant difference was found between groups, with students reporting more change in value than their CI counterparts. PT students, as novices in clinical practice, are anticipated to demonstrate greater change behaviors than established and experienced clinicians. In a longitudinal study by McEvoy et al,[38] change in the EBP

domain of 'relevance', defined as "value, emphasis or importance"[38(p3)] declines during the first two years of clinical practice. Most CIs in this study reported maintaining or increasing their sense of value in STMs over the course of the clinical experience; involvement in clinical education has been found to positively impact views related to research and EBP,[39] and, based on these findings, may extend to relevance of STMs.

Self-report measures were more heavily utilized by participants, although both groups felt performance-based measures provided more valuable information. Most students felt their CIs defaulted to a limited number of these 'recommended' self-report STMs, not looking to STMs that may be more appropriate on an individual patient basis. The STM 'value equation', i.e. STM suitability and appropriateness for setting and population/diagnoses, was discussed by nearly all participants. Functional relevance and ease were most valuable to those in pediatrics, acute care, inpatient and subacute rehabilitation settings. Time, space, and ease to administer and interpret STMs were most valuable to CIs in outpatient environments.

Students and CIs described regulation and reimbursement as the most important drivers for STM use; the most valuable STMs were identified as those known to be acceptable to payors. With the current MIPS requirements, healthcare providers are tasked to report on outcomes. A number of measures are recommended by CMS; these "high-priority" measures are pre-populated into systems like Focus on Therapeutic Outcomes (FOTO),[129] which are designed to ensure compliance and optimize reimbursement.[6] The use of STMs to facilitate the direction of the plan of care, improve monitoring of patient progress and program effectiveness, and enhance communication with the patient and other healthcare providers, were not observed by students as primary

reasons for STM use during their clinical experiences. Clinical instructors did, however, express in their survey responses that these were valuable reasons to use STMs. This disconnect may be related to the aforementioned time and payor constraints; selection of STMs may become less individualized and less focused on the quality of the information gleaned when expediency and reimbursement weigh heavily on decisions regarding STM selection and purpose.

PT students. The majority (88%) of PT students felt STMs were "often valuable" or "always valuable to physical therapist clinical practice, with 76% reporting these ratings for the clinical practice where they were completing their CE. Forty-one % reported higher levels of personal value in STMs by the end of the CE. As discussed previously, fair to moderate positive correlations were found for students across all aspects of (1) value, i.e. to profession, to practice, and self, (2) all confidence change deltas, and (3) STM use. Clinical focus area and clinical practice setting, although associated with STM confidence change, were not found to be statistically correlated with student ratings of STM value by the end of the CE. Despite these findings, students interviewed discussed differences in what they observed and perceived related to STM value on CE, with assertions that STM use and value in acute care and pediatric school-based settings were lower as compared to outpatient and rehabilitation environments. Although research indicates that students defer to clinical practice when dissonance is found between what is learned in the classroom and what is experienced in the clinical environment,[30,85] students in this study did not report a negative shift in value when in environments not consistent with their value beliefs. Unlike the findings by McEvoy et al[38] and Dutton et al,[30] the students in this study did not report frustration with differences

between the academic and clinical environments but openly accepted these differences, indicating they learned what they wanted for their future clinical practice and what they did not, even from less than optimal educational experiences. These less than optimal experiences were discussed as a "rite of passage", providing students with an opportunity to reflect on who they truly wanted to be as a clinician. The students that volunteered to participate in the surveys and interviews may be different than those that did not; individuals willing to engage in research may not be representative of all PT students.

Clinical instructors. The majority (91%) of CIs felt STMs were "often valuable" or "always valuable to PT clinical practice, with 81% reporting these ratings for their current clinical practice. Personal value associated with the use of STMs was largely unchanged by the CE, although 16% did report greater personal value. Two questions from the CI survey were analyzed via PCA, with items from these questions clustering on a number of distinct component factors. Three factors, two from Q20 and one from Q18, represented positive CI attitudes and behaviors related to the value, utility, and appropriateness of STMs. As would be anticipated, these positively oriented factors were highly correlated with each other and with beliefs related to value to the profession, to clinical practice, and personal value statements of agreement; these attitudes, beliefs, and values were consistently held across these positively framed items. The study participants were found to have higher ratings of STM value than those found in a 2012 study of PTs, where 60% felt STMs were important.[61] Although CIs experienced less change in STM value from a clinical experience than students, this change was still notable; a change in STM value was part of a significant positive shift to the right, with value positively associated with change in confidence, frequency of use, and reason for use for CIs over

the course of the CE. This is meaningful; as attitudes and beliefs related to SM value shift from burden to benefit, physical therapists have an opportunity to advance as evidence-based practitioners, individualizing patient/client management based on a sound individual level belief system and not solely based on organizational and extra-organizational expectations that may be perceived as onerous and restrictive.[55]

Clinical instructors without APTA membership had lower levels of agreement with the statement 'STMs have sound psychometric properties'. Although a weak inverse correlation (-0.26) was found in this study, APTA members have been found to report higher STM value and use.[8,22,24] APTA members also have more ready access to individual APTA practice section and APTA's Research Section's Evaluation Database to Guide Effectiveness (EDGE) Taskforce[3] recommendations, which provide detailed information about STMs; CIs with this access may have more familiarity with the reliability and validity of STMs.

Despite research that indicates that mandated use of STMs may negatively impact personal responsibility and value in STMs,[8,68] findings from this study show fair to moderate correlation between organizational mandates to use STMs and positively oriented attitudes, beliefs, and value. Organizational mandates were not correlated with negatively oriented STM attitudes. The belief that STMs are easy to use, useful for a variety of reasons, have sound psychometric properties, and are valuable to profession and clinical practice, were all significantly associated with facility mandates and reimbursement requirements. The use of STMs has become more entrenched as a practice expectation, as a reimbursement requirement, and as an integral component of academic

preparation, which may explain the less overtly negative view by study participants of the organizational and extra-organizational constraints found in earlier literature.[8,130]

Stajkovic[79] refers to a 'motivational paradox' found when organizational mandates conflict with personal choice. However, when organizations focus on positive reinforcement rather than negative consequences for preferred behavior, provide adequate resources and training, and seek employee input into the integration of mandated expectations, intrinsic motivation and external drivers can align in a positive way.[8,79] This was found to be consistent with findings from most of the qualitative interviews. Overall, CIs described adequate access to STMs, participation in work groups to identify STMs most appropriate for their setting and patient/clients, and a supportive culture encouraging use. Participants practicing in environments where STMs were mandated still felt autonomous, that they could go 'outside the box' of the recommended STMs if they felt another STM was a more appropriate alternative. None of the interviewees described negative or punitive organizational cultures related to STM mandates.

Negative STM attitudes and behaviors cited in the literature are consistent across health professions within and outside the U.S. Lack of organizational support and prioritization, individual clinician and patient factors, practical issues such as time to administer, difficulty scoring, clinician exposure/familiarity, knowledge, poor access to standardized tools, and lack of resources are reported as some of the most notable factors influencing these negative views.[8,10,11,20,22,55,68-70] While Abrams et al[69] found that more than 80% of physical therapists felt that time to administer tests was burdensome, this study indicated 53% of participants believed STMs take too much time to administer and 48% agreeing that STMs take too much time for patients/clients to complete. These

findings are in alignment with the findings by Jette et al,[68] where 43% of PT respondents concurred with similar statements. Across the literature, reports that STMs may be confusing and too time-consuming for the patient to complete, or unsuitable for certain patients or patient populations, are prevalent.[10,20,22,68] This was a concern for the participants in this study as well, with 50% indicting that STMs are difficult for patients/clients to complete, 55% indicating STMs are confusing for patients/clients, and 37% indicating that STMs are not relevant for their patient/client population. This finding was noted across practice settings.

Although it has been 10 years since the publication of Jette et al's research exploring this topic,[68] concerns about STMs remain consistent. Although there has been consistent academic focus on teaching STMs over the past 10 years, academicians may not be preparing students to use STMs in the "real world" of high productivity and limited resources. For students, learning hundreds of STMs is less important than PT education focused on providing them with a strong core toolbox for different practice settings and patient populations, considering not only psychometric qualities of STMs and their purpose, but how to navigate through the available STMs to identify those that are reliable, valid, and aligned with the reported practical needs and concerns of clinicians across different settings and working with different patient populations. Academic preparation can focus on raising the bar for excellence in EBP while preparing students to be practical and cognizant of barriers, perceived or real, in clinical practice. Students and new clinicians should be armed with a refined "arsenal" of STMs that best address the barriers and needs identified over the past 10 to 15 years of research on this topic. If students are well versed in accessing and negotiating EBP and STM resources

when the "core" tool box is not sufficient, they will still be well prepared and, perhaps, better able to meet practice demands and perhaps even push the bar forward.

Knowledge/Use

Significant, fair associations between use, value, and confidence in using STMs were identified for both CIs and PT students in this study. These findings contrast those of Sabus et al,[24] who found that although both students and CIs improved in EBP competency after CE, EBP behaviors (e.g. use) did not change. Approximately 16% of CIs indicated they were using STMs more frequently than before the clinical experience, with 21% of students indicating they were using STMs more than anticipated. No statistical differences existed between groups on report of STM use frequency.

Although most CIs and students indicated that they felt that STMs were used with more regularity by younger CIs, this was not substantiated in the quantitative analysis. Demographic characteristics of CIs were not correlated, or were weakly correlated, with change in use, although research does support that higher degree attainment and fewer years in practice positively influences use of STMs.[8,22,24] Demographic characteristics were also not associated with use variables explored for students. Students that reported using STMs more than they anticipated, however, had greater confidence change with STMs and higher ratings of STM value to profession, practice, and self by the end of the CE. Clinical experiences are approximately 1/3 of PT professional practice curricula;[25] even over the course of a single CE of nine to 10 weeks, significant positive gains across all constructs were found. Experiential learning in clinical learning environments is critical to skill development.[31,84] As students learn in practice they gain context which lends itself to greater integration of behavior.[84]

Historically, research on STM use has focused on PTs as the study population and not specifically at CIs as a subset of that group. In 2009, Jette et al[68] found that only 47.8% of PTs reported using standardized outcome measures in practice. Findings from this study were higher, with 65% of the CIs (n=113) completing the second half of the survey using at least one STM in practice. Although there are a number of potential explanations for this change over time, as discussed, another consideration is that CIs may place higher value on STMs and EBP, regardless of terminal degree status and time in practice, because of the access to new knowledge that students bring to the clinic. This was a consistent theme in the qualitative analysis, with all CIs expressing that students bring current research and new ideas regarding treatment and assessment to the clinic. All but one interviewed CI participant indicated that a student introduced them to a new STM during a CE, with a few indicating these STMs were still in their assessment repertoire.

Ten different STMs were identified by CIs as 'learned from a student' in the survey phase. Three of these STMs, i.e. Patient Specific Functional Scale (PSFS), Ten-meter Walk Test, (10MWT), and Five Times Sit to Stand (FTSTS), were identified across more than one STM category. These items were the Tinetti Mobility Scale, the PSFS, FTSTS, Gastrocnemius Stretch Test, 10MWT, Sharpened Romberg Test, Shoulder Pain and Disability Index (SPADI), and the Talocrural Joint Posterior Glide Test. the Modified Chair Step Test, and the Movement Assessment Battery for Children (ABC). These findings further support the premise that students bring knowledge to the clinic.[39] Although none of the items reported are 'new' STMs, published in the past 10 years, these STMs have undergone extensive psychometric testing and validation across populations since published. With the increased emphasis in PT academic curricula on

EBP, it is reasonable to assume that STM instruction would focus on instruments with a robust body of research supporting their utility, reliability, and validity and that these instruments would be the ones students would be most likely to value and share with their CIs. Another potential explanation for why some of these STMs might have been presented by students during a CE is that many of these STMs fit well within the productivity constraints of typical clinical practice. The 10MWT, the FTSTS, Modified Chair Test, Gastrocnemius Stretch Test, Sharpened Romberg Test, and the Talocrural Joint Posterior Glide Test are time-efficient STMs, with negligible equipment requirements to administer. Patient/client self-report measures are also time-efficient; the SPADI and PSFS are examples of this from the list of STMs learned from a student. With growing awareness and appreciation of the time demands during terminal CEs, students may choose options that are quick to administer and interpret.

Standardized tests and measures by general practice area or population categories. One purpose of this study was to explore the alignment or conflict between the STMs students learn in their academic preparation and those most commonly used in clinical practice. This was explored across the nine general practice or population categories presented to study participants, with findings presented by category here for clarity.

In this study, logistic regression did not reveal that clinical practice setting or clinical focus area were predictive of 'user' versus 'nonuser' status. The qualitative findings, however, presented setting-specific nuances that were consistent with the previous literature.[20,22,68,130] In a 2009 survey of 498 PTs, acute care PTs were the least likely to report use of STMs in practice, with only 16% indicating use of STMs.[68] Only

school system PTs presented with similar odds, with 7% reporting use of STMs.[68] Outpatient and home health therapists were most likely to use STMs, seven and 11 times more likely, than PTs in acute care.[68,69] For outpatient PTs, the CMS PQRS and current MIPS program reporting requirements are likely to influence heavier STM use, as does the Outcome Assessment and Information Set (OASIS) mandated in the home health setting.[5,6,68] Amongst therapists managing a primarily orthopedic caseload, STM use has been found to be higher, with these users indicating less frustration in finding STMs 'suitable' for the conditions they typically see.[61,68,69]

To best illustrate the differences in use by practice setting, use and knowledge thresholds were established to allow for a brief presentation of alignment or conflict between student and CI responses and across categories. Thresholds of at least 75% of CI respondents indicating occasional or routine use, or 75% of students indicating the STM was used during a CE, were established as the hallmarks of a STM being "commonly used" for that general practice area of population. This same threshold was established for PT student knowledge, with a STM requiring at least 75% of students indicating it was taught during their academic preparation to be considered "commonly learned."

Across the nine categories presented, students reported knowledge of nearly all of the recommended STMs by practice category or patient population. The breadth of student STM knowledge across these categories did not translate to these students reporting a comparable level of personal use of the STM during their CEs. We are unable to determine if this was based on opportunity (e.g. availability of appropriate patient/clients to trigger use of a STM) or autonomy (e.g. required to only use the STMs

used by their CI/clinical practice). A notable disparity does exist, however, between student knowledge of STMs and use by student and CI during a CE.

Although a small percentage of the total number of recommended STMs presented in each category, both groups were in relative alignment as to the STMs used most often in that category. When differences did present, students identified STMs that were more contemporary for that category, published more recently, than the corresponding STMs identified by CIs.

Acute care. Twenty-two items were presented to participants in this category. None of the STMs triggered the CI threshold of occasional to routine use. The most commonly used STMs were the Borg Rating of Perceived Exertion (RPE), the Faces Pain Scale, the Functional Independence Measure (FIM), the Timed Up and Go (TUG), and the Tinetti Mobility Scale. Six STMs were reported as not used at all by students during a CE for this setting/population (i.e. Action Reaction Arm Test (ARAT), Early Activity Scale for Endurance (EASE), Energy Expenditure Index, Modified Medical Research Council Questionnaire for Chronic Obstructive Pulmonary Disease (COPD), Saint George Respiratory Questionnaire (SGRQ), and University of California San Diego Shortness of Breath Questionnaire (UCSD SOBQ), despite these STMs being recommended in practice guidelines and identified by 87.5% or more of the students as learned in their prior academic coursework. Only the Activity Measure for Post-Acute Care (AM-PAC) did not meet the 'commonly learned' threshold.

Although students have academic exposure to the recommended STMs for the acute care setting, a small percentage are being used by the CIs they are working with. This is consistent with statements expressed by CIs in this study; CIs in acute care

expressed the greatest frustration about perceived barriers related to space and equipment, STM sensitivity to change over a short term stay, and a lack of awareness/training in functionally oriented STMs validated for acute care. Most CIs and students described the use of STMs as not of emphasis or particular relevance in their clinical decision-making for hospital-based patient care. This was an interesting finding as many newer STMs, like the AM-PAC, Functional Status Score for the Intensive Care Unit (FSS-ICU), and the Physical Function Intensive Care Test-scored) PFIT-s, were designed to provide valuable information to predict discharge disposition, rehabilitation potential, level of service required, and quality of life.[130] Clinicians in acute care may not have the exposure to many of these newer STMs; educational initiatives from professional practice sections and academic programs should highlight the value these STMs can provide to clinicians in this setting.

Cardiovascular and pulmonary. None of the 13 STMs in this category triggered the CI or student threshold of occasional to routine use, although all 13 items were identified as learned by students in their academic preparation and met the student knowledge threshold. The TUG was the most heavily utilized STM, with 68% of CI respondents indicating they used it occasionally or routinely, with 43% of students indicating they used the TUG during their CE. The BBS was a close second for both groups. Five of the recommended STMs were not used by students at all during a CE for this setting/population (e.g. Chronic Respiratory Disease Questionnaire (CRDQ), Modified Chair Step Test, Modified Medical Research Council Questionnaire for COPD, SGRQ, and UCSD SOBQ. Although students have academic exposure to the

recommended STMs for cardiovascular patient populations, only a small percentage are being used by the CIs they are working with.

Geriatrics and home health. None of the 21 recommended STMs in this category met the "commonly used" threshold for either group. The most widely reported STMs used by CIs were the BBS, LEFS, and the TUG. In addition to these items, students also indicated higher use of the FTSTS and QuickDASH. Two items were reported as not used by any students during a CE for this setting/population (e.g. Craig Hospital Inventory of Environmental Factors (CHIEF), Trunk Muscle Power and Endurance). With the exception of the KSS, all items met the "commonly learned" threshold. None of the CIs in this study indicated they worked in home health; however, 87 CI responses were collected in this category which would indicate that these findings are more reflective of the STMs most commonly used for the geriatric population. Interviewed CIs and students reported routine use of the BBS or TUG to assess fall risk and self-report measures like the ABC. Little variety was noted in the selection of STMs; students also indicated the STM results were documented for Medicare purposes but were not directly utilized to guide the plan of care.

Hand rehabilitation. None of the PT students or CIs indicated that their primary clinical focus area was in hand rehabilitation. Nine items were presented, with none triggering the "commonly used" threshold. Only four of the items (i.e. DASH, QuickDASH, PSFS, and Upper Limb Functional Index) were found to be used on a CE by students. Despite this, all items met the "commonly learned" threshold.

Orthopedic/musculoskeletal. Approximately half of all CIs and students identified an orthopedic/musculoskeletal primary clinical focus area. Forty-seven items

were presented in this section with only Ankle Dorsiflexion Range of Motion (ROM) meeting the "commonly used" threshold for CIs. None of the items met the student use threshold, although Ankle Dorsiflexion ROM, FTSTS, LEFS, and Observational Gait Analysis were used most often. Forty-five of the 47 items met the "commonly learned" threshold.

Outpatient PTs, traditionally found to have a heavier orthopedic/musculoskeletal caseload, have been found to be more likely to use STMs than individuals in other practice settings.[14,68] Few of the STMs presented in the survey were heavily used. This finding was surprising, as many interviewees discussed routine use of a limited number of STMs, primarily patient report measures. Many of these STMs were reported to be automatically populated into the EMR or placed in the patient chart solely based on body part or diagnosis and not due to individualized selection of the STM by the clinician. A number of interview participants from both groups expressed that there was a tendency to default to these few readily accessible STMs due to time constraints and knowledge that payors "liked" them. A student expressed that the number of orthopedic/musculoskeletal STM options could be daunting; others concurred that there were plenty of suitable STMs but this many may not be necessary.

Neurology. The number of STMs recommended by the Academy of Neurologic Physical Therapy of the APTA and the EDGE Taskforce is substantial. For this category, all 130 items were presented to participants. Burton et al[10] found that 96% of health professionals in a stroke rehabilitation setting used at least one outcome measure per patient; however, 81 different tools were used, and none with consistency.

Only the TUG met the commonly used threshold for CIs; none met that threshold for students. The VAS, TUG, Sharpened Romberg Test, Numeric Pain Rating Scale, and FTSTS were used most often on CE. Only one item, the Bow and Lean Test, out of this extensive list was not "commonly learned" by students, with that item still garnering 65% of students indicating they learned the STM in their prior academic coursework. One CI expressed frustration about a lack of appropriate STMs for ventilator-dependent patients or those with high level involvement on her spinal cord injury (SCI) unit. Although only discussed by one interviewee, this is of note given the number of recommended STMs in this category. With so many recommended STMs under the umbrella of neurological conditions, with distinct recommendations for patients with SCI, vestibular conditions, multiple sclerosis, and more, the sheer number of options might be daunting. Despite this, there may be patient/client populations, like those with high acuity and significantly impaired mobility, which may not be as well represented by the STMs currently available, as was indicated by an interviewee. This should be considered by the Academy of Neurologic Physical Therapy as an area of focus and development, to ensure clinicians have tools that capture change and potential in this subset of patients/clients.

Oncology. None of the 40 items in this category met the commonly used threshold for either group, although all items met the commonly learned threshold. Seventeen of the 40 items were reported as not used by any of the student participants during a CE for this setting/population. The most routinely identified STMs used across groups were the Numeric Rating Scale and Visual Analog Scales for pain, Borg Rating Scale of Perceived Exertion, the TUG, the DASH, the 6MWT, and the BBS. It is interesting that none of the quality of life measures, anticipated to be of importance to

clinicians working with this patient population, were routinely used. As none of the survey respondents indicated oncology was their primary clinical focus area, this may require further exploration to hypothesize why this may be.

Pediatrics. Sixteen STMs were presented in this category, with half of the STMs not used by students during a CE for this setting/population. All 16 items met the commonly learned threshold. The most commonly reported STMs used were the Bruinicks-Oseretsky Test of Motor Proficiency (BOT), Peabody Developmental Motor Scales-2 (PDMS-2), and the Gross Motor Function Measure (GMFM). Pediatric CIs and students who had participated in pediatric CEs were represented in the qualitative phase of this study; all expressed some level of frustration that STMs were not always applicable for their patients/clients. Interviewees in these pediatric environments, especially school-based environments, cited how restricted they were by school district expectations for use of certain assessment tools, even if the tool did not provide particularly useful information. Although not prevented from using other STMs, these interviewees felt the most constrained by mandated expectations. With the focus of school-based PTs resting on their patient/client's ability to engage in education, there may be poor alignment between the STMs available and their utility as tools to evaluate progress towards educational goals.

Women's Health. None of the students or CIs indicated that their primary clinical focus area was in women's health, nor did any of the 21 STMs presented meet commonly used thresholds. Students were less familiar with STMs in this section than was found in other categories. A third of the items recommended for this patient population did not meet the commonly learned threshold, with a third also not found to be used during a CE.

In this category, there was more discrepancy between the groups on STMs used. Students reported using the COREFO and PFIQ-7, while CIs indicated the Oswestry Low Back Pain Disability Questionnaire and LEFS most often. Women's health is a very specialized area of practice; as none of the participants indicated this as their practice area, use thresholds from this category may not be meaningful.

Hypothesis Testing

1. H_0: CI and PT characteristics will not be associated with, or predictive of, STM attitudes or behaviors.

   Null hypotheses $H1_0$ is rejected.

2. H_0: No differences will exist between CIs and their PT students in STM knowledge/use and/or perception of STM value.

   Null hypothesis $H2_0$ is rejected.

3. H_0: No change will exist in CI or PT student report of attitudes or behaviors associated with STMs after the clinical experience.

   Null hypotheses $H3_0$ is rejected.

4. H_0: PT student and CI characteristics will not be associated with, or predictive of, a change in attitudes or behaviors in STMs in their clinical partner after a clinical experience.

   Null hypotheses $H4_0$ cannot be rejected; although there may be a small but significant difference in CIs having positive, intrinsically focused attitudes towards STMs when paired with students with higher STM confidence change, the small number of linked PT student and CI surveys and disparate grouping distributions notable reduces confidence in the statistical finding.

The qualitative phase of this study provided rich detail to supplement the quantitative findings related to STM confidence, value, attitudes, and use/knowledge. The interviews also allowed for a broader exploration of clinical education and practice.

Implications for Clinical Education and Practice

The concept of STM "benefit versus burden" emerged from both phases of this research study. "Benefit versus burden" has a tipping point based on a participant's belief system about the appropriateness and value of STMs to PT practice, the profession, and to self. This belief system is influenced by a complex system of extrinsic and intrinsic factors and experiences. Many of the factors influencing STM use found in this study were consistent with those in the literature; the findings from this study provide substantiation that clinical education also influences STM confidence, value, and use. Recommendations to enhance EBP/STM integration into clinical practice are represented within this revised framework.

Knowledge translation in healthcare is multifaceted, with organizational, environmental and individual professional contextual layers.[8,55,131] Dannapfel et al[55] describes nine conditions influencing research into practice which resonate with the findings and recommendations from this study. Attitudes, motivation, and knowledge/skill to use research influence the individual level; leadership support, organizational culture, research-related resources, and knowledge exchange are meaningful at the organizational level; and EBP guidelines, external meetings, networking, conferences, and academic research and education were important conditions at the extra-organizational level.[55] Research exploring organizational efforts to improve EBP and STM use have demonstrated mixed results; however, the technological

advances over the past 10 to15 years, such as ready internet access in the clinic, web-based databases with STMs organized by population and practice setting, and robust EMRs have reduced some of the perception of 'burden' associated with STM mandates.[61,68,130] As organizational mandates have become the norm, more neutral or positive views associated with the imposition of these expectations have been found, especially when they coincide with educational initiatives and professional support.[69] Sustained active engagement and support at the organizational level is necessary for lasting change, demonstrated through commitment to physical, financial, and knowledge-based resources.[53,55,57]

Mixed evidence exists as to the effectiveness of journal clubs, mentorship programs, EBP education programs, or knowledge brokers in facilitating EBP behaviors.[51,52] Engaging clinicians through research in practice has been found to increase value and commitment to EBP, but implementation of programs to support this are time and labor intensive.[53] Research within the past decade has demonstrated more positive outcomes with the use of targeted knowledge translation strategies to promote EBP behaviors and enhance quality in practice.[131-134] A 2018 study found that knowledge translation efforts, focused on the environmental level, were successful at changing acute care therapist use of STMs.[130] McDonnel and colleagues[130] found that acute care therapists were more likely to use STMs that were prioritized for them in an EMR based on clinical utility, that were performance-based over self-report, that required minimal equipment, and were able to be completed quickly. Standardized tests and measures that aided in the assessment of fall risk, functional status change, and prognosis for discharge disposition or functional outcome were found to be of greatest clinical utility to acute

care therapists.[130] Integration of these carefully selected STMs into an EMR, provision of printed resources, and use of knowledge brokers led to a statistically significant increase in use of STMs, bridging many of the reported knowledge and access barriers to STM use.[130] Students can assist in these efforts, bringing their knowledge from the classroom into the clinic to recommend quality STMs by setting and population, identify high quality print resources, and train providers to efficiently select, administer, and interpret these STMS as part of their clinical education expectations.

Academic programs, health care organizations, researchers, and work groups tasked to develop STM recommendations should carefully weigh the benefits and challenges that have been identified as of particular importance to PT clinicians, by clinical focus area, practice setting, and specific patient/client populations. These environmental considerations matter; if the currently recommended STMs do not align with the ideals and needs identified by the end users, if users are not provided the time, training, and resources to overcome key barriers identified by setting and population, STM use will likely not change. Academic programs can prepare future clinicians with the knowledge to overcome these barriers. Students should be taught strategies for STM selection that balance payment considerations, efficiency, and value by respective practice setting and patient populations. Armed with that knowledge before being faced with the pressures of a busy clinical practice, students may be better able to negotiate those challenges and still select STMs that provide value and inform clinical decisions.

Although students enter clinical practice with a wealth of STM knowledge, alignment with community of practice/organizational culture standards of practice, ideal or substandard, often occurs.[22,30] The culture of the PT environment where students have

their clinical experiences influences their future clinical practice.[22,31] Clinical instructors influence the future EBP practice behaviors of their students, perhaps even more so than their academic preparation.[33,62] Academic and clinical partners must focus on quality and consistency during clinical education, as the lasting impact of clinical education on EBP behaviors may resonate well beyond graduation.[26,38] This challenging and complex issue has been the focus of dialogue amongst stakeholders in clinical education, with a national Clinical Education Summit in 2014 leading to numerous initiatives and work groups focused on excellence in clinical education. These efforts are crucial and demonstrate recognition of the value and impact clinical education has on entry level PT education and clinical practice. Health care and academic organizations should collaborate to best prepare CIs for this important role and recognize their efforts, committing time and evidence-based resources to their development. The collaborative efforts between academic and clinical partners committed to quality clinical education and excellence in clinical practice may include support of these CIs through APTA membership, specialty certifications, CI training programs, and transitional DPT degrees. For example, academic programs may offer reduced tuition to training programs and coursework in recognition of CIs that work closely with their program, a mutually beneficial solution. These areas of focus are based on the literature; attainment of a terminal degree and specialty certification are found to be positive individual level influences to the implementation of EBP.[55] Additionally, APTA membership provides access to a growing body of STM resources and has also been positively associated with personal EBP behaviors.[22,55]

Although decline in utilization of EBP in practice during the first year of practice has been found,[38] this can be ameliorated. Providing students with clinical learning opportunities, in supportive communities of practice, is critical to their professional development.[31]Additionally, academic programs should be explicit in their EBP/STM expectations and curricula, building a strong sense of value and confidence in EBP/STM prior to CEs. This curricula should incorporate classroom and CE elements for the most impact.[24] For example, after learning a STM, academic programs could provide students opportunities to use the STM with not only their classmates but with actual patient/clients or standardized patients. Integrating experiences that simulate real clinical situations, outside the traditional classroom and clinical laboratory environments, may improve student confidence and ability to adapt to the challenges and barrier that may present when they enter clinical experiences. Practice breeds confidence; confident students are more likely to stay true to EBP tenets and better able to reconcile dissonance when it presents between classroom and clinical environments.[30,31,84,90] Clinical experiences threaded throughout the professional practice curriculum may aid in self-efficacy/confidence development; although this is only a hypothesis, further exploration may be warranted as opportunities for situated learning are impactful.

The individual CI/student relationship during CEs significantly impacts student EBP/STM values, confidence, and use.[24,38] This study adds to the limited evidence that students influence their CIs during CEs as well. Clinical experiences are opportunities for mutual learning and knowledge translation. Knowledge brokers, by definition, "facilitate the transfer and exchange of information."[132(p1)] Students serve as knowledge brokers, even when not explicitly tasked to do so. Thematic analysis supported this, with the

acquisition of new knowledge and reinforcement of previously learned concepts expressed as valuable to both clinical partners. The participants that described being explicit in seeking knowledge, through verbalization of expectations and thoughtful development of activities and experiences, were most positively impacted. This has been described as *reflective knowledge building*, defined as "the extent to which teachers reflect on their own understanding of the material and integrate it with their own prior knowledge while teaching their student."[135(p406)] Clinicians that seek and embrace collaborative learning, empower their student - building confidence in the student's role as both learner and knowledge broker. Clinical instructor training programs should encourage CIs to be mindful and intentional in seeking knowledge from students, structuring activities and projects into the CE that promote mutual learning.

In conjunction with these efforts, academic educators need to prepare students for their role as knowledge brokers. The process of teaching others reinforces learning and may lead to a lasting and positive impact on clinical practice.[135] Academic programs should incorporate knowledge translation and behavioral change theory into an explicit preparatory process for students as knowledge brokers, prior to clinical education experiences. Academic faculty should help students identify knowledge that may be of most value to their clinical partners and positive, constructive ways to present this knowledge during clinical experiences. Students should be guided through the development of the crucial interpersonal skills and communication strategies needed to engage effectively, not only with patients/clients, but with their CIs as well. It is also important that students have awareness of the practical considerations with STM use, not only the psychometric properties and rationale for use, but the potential barriers and

concerns to STM use as well. Students would benefit from education that also provides them with suggestions for alternatives or means to ameliorate/address concerns that may be detrimental to STM adoption or use in clinical practice.

Limitations and Delimitations

Quantitative Limitations/Delimitations

The CAPTE[4] requires educational programs to have a curricular plan that demonstrates students can "select and competently administer tests and measures"[4(p28)] and evaluate the data from tests, measures, and other relevant sources for clinical decision making.[4] The accreditation guidelines[4] stipulate students have exposure to tests and measures from specific categories, aligned directly with the categories of tests and measures (i.e. aerobic capacity/endurance, balance, gait, motor function) provided in The Guide to PT Practice.[1,28] The accreditation guidelines stipulate CAPTE[4] does not, however, provide comprehensive guidance as to which tests and measures should be emphasized and leaves much of this to the discretion of each educational program.[4]

Collecting data solely from one educational program where the majority of clinicians may be graduates from that program and the students have a common experience related to STM exposure in their academic preparation would likely not provide an accurate picture of STM use in clinical practice across the United States. A regional survey of the New York-New Jersey Physical Therapist Education Programs provided a more broadly representative "snapshot" of the state of STM use in contemporary clinical practice and academic preparation of STMs across a number of programs.

Based on the composite demographic profile of participants as compared to their population demographics, results from the surveys may be considered reasonably generalizable but may not be fully representative of CIs across the United States. An analysis of the PT student and CI participant demographic characteristics from the quantitative phase demonstrated that study participants were relatively consistent with population demographic data from CAPTE,[25] for students, and the APTA,[136] for PTs. More of the study's CI participants indicated an entry level doctoral degree (54.3%) as compared to national data (25.5%) and a higher percentage of APTA membership at 43.3% versus 30%. The mean years in the profession was 11.7 for the CIs in this study as compared to 18.4 years in the 2013 APTA Physical Therapist Demographic Member Profile.[136] No national demographic data is available for PTs that specifically identify as CIs, which prevents an accurate determination as to whether these differences are meaningful. Some of these differences may be explained by the 2013 data collection period of the most current PT demographic profile; in the past 6 years, accredited PT education programs have transitioned fully to entry level DPT programs, which may explain the higher percentage of entry level DPT- trained study participants. The APTA has demonstrated a greater reach and value to members in recent years, which may substantiate the higher membership rate noted in the study group or it may be that clinical education resources and training made available through the APTA may lead CIs to maintain APTA membership more than other PTs.

Although collecting data from both students and CIs provided a more comprehensive and accurate picture of STMs, a potential limitation exists with relying on self-reporting of behavior rather than direct observations of the researcher. According to

Portney and Watkins, " There is always some potential for bias or inaccuracy in self-reports, particularly if the questions concern personal or controversial issues."[100(p327)] Despite this limitation, self-report measures are generally considered valid.[100] For variables such as attitudes, motivations, perceptions and beliefs, self-report may be the only logical means to obtain information.[100] Although not controversial per se, individuals may have been uncomfortable responding honestly about the research topic, as utilization or attitudes about STMs may be perceived as a reflection on their personal identity as a physical therapist. This did not appear to be a factor during the interviews, with both groups speaking freely about their perspectives on clinical education and STMs, even when these perspectives were not negatively oriented. These barriers were also minimized through neutral wording of survey questions and the anonymity provided with web-based surveys.

Attentiveness and recall over the course of a clinical experience may influence the responses of participants. As with self-report, there is the potential for bias and inaccuracies when study participants must remember past events.[100] By limiting the period of time for response to the final few weeks of the clinical and closing the survey within 2 weeks after the clinical experience ends, the length of the recall period was minimized.

In total, 250 participants were represented in phase one of the study, meeting the expectations set from a conservative sample size estimation. Of the total participants, 123 were PT students and 127 were CIs. Distribution of sample size across groups was ideal and roughly equivalent. Five hundred and eighty two PT students received the recruitment email, resulting in a 21.1 % response rate. An accurate response rate could

not be calculated for the CI respondents as some PT students may have had more than one CI; this information was not shared with the researcher. Assuming a minimum of one CI to one PT student, it can be anticipated that the CI response rate was comparable to that of the PT students. Although it was anticipated that this purposively selected pool of participants would respond as an internal audience with a response rate of 30 to 40%, this was not achieved. A 21% response rate is, however, acceptable as the ideal *n* established based on the sample size estimation was achieved. Completion rate assessment was thus negatively impacted by survey composition.

Survey attrition rates were challenging to calculate due to an inability to definitively determine whether a lack of row response associated with individual STMs was due to unfamiliarity with the item, error, skipping of a category by the CIs, or as a result of true attrition from the survey. CI participants were provided the option to skip general practice area and population categories of STMs that were not applicable to their clinical practice setting. It is unknown if the instructions to leave a row blank entirely if the CI participants were unfamiliar with the STM was followed or if the lack of a row response was due to these other potential reasons. This posed a concern with the PT student survey as well; even though students were instructed to complete all categories, it is unknown if PT students followed instructions to leave the row blank because they did not learn the STM or if their lack of response was in error or as a result of attrition.

Analysis of use by CIs and knowledge by students was further limited by STM redundancies built into different general practice area and population categories. Some STMs were represented in more than one category, as the STM was commonly used or recommended for that general practice setting or patient population. This was done in an

attempt to capture this information comprehensively and completely, but negatively impacted the ability to do more than descriptive analysis of responses related to use and knowledge by category, or as a simple categorical 'user' or 'nonuser' designation.

To maintain confidentiality, all survey requests and associated identification codes were sent to potential participants by DCEs. The extra step of entering the identification code into the survey appears to have negatively impacted the number of coded responses provided. Although a total of 170 coded responses were collected (64 CI, 106 PT student), only 25 linked responses between a PT student and their CI were identified. The small number of linked responses limited statistical analyses based on a 'paired' relationship. It had been anticipated that these partner responses would elucidate research question 4; without an adequate subgroup sample size, this analysis was not deemed appropriate and curtailed.

Qualitative Limitations/Delimitations

Follow-up interviews have been advocated as a mechanism for checking the authenticity of emerging insights identified by researchers and to ensure that these have meaning for participants.[137] In-person follow-up and unrestricted time for interviews is preferable in qualitative research; however, it was not feasible for this study to conduct repeated or lengthy interviews due to the time burden on busy clinicians spread out over a large geographic region. Follow-up email or phone interviews were considered, as needed for clarification purposes, to minimize participant and researcher burden.

The qualitative component of this mixed methods study provided in-depth, rich description regarding physical therapist students' and their CIs' lived experience of integrating STMs into clinical practice. The results from qualitative research cannot be

generalized. However, the results comprise expressions of life experiences[91] that (1) may provide insight into how other physical therapy students and CIs perceive their ability to apply STM use in clinical practice, and (2) may provide a better understanding of factors that contribute to the current level of STM integration into clinical practice.

Although efforts were made to recruit participants reflecting diverse backgrounds, a lack of race/ethnic diversity was noted across all participants and a lack of gender diversity in the CI group which must be considered when establishing conclusions from the qualitative phase. The nine CI participants from the qualitative phase were all female with the exception of one male participant; however, a more equal representation by gender was noted in the PT student (n=8) distribution. Both groups identified as not Hispanic/white, with no diversity reported by ethnicity/race. Clinical instructors reported varied primary clinical focus areas and clinical practice settings and a broad range of clinical experience (range: 1.5-35 years) and years in current practice setting (range 1.5-29 years). All but two PT students reported an orthopedic clinical focus area, with a mixed distribution of private outpatient practice and health system or hospital-based outpatient facility or practice, but reflected on all their CEs when responding to the interview questions. This allowed for more broadly representative responses regardless of their clinical education setting at the time of study participation. The majority of all participants, 59%, reported the Middle Atlantic region as the geographic region of their practice or clinical experience. These findings should be considered when generalizing results to other PT student and PT populations.

Another potential limitation is that the researcher's presence through the interview process may affect participant responses; my relationship with some of these PT students

and CIs as the DCE for an academic program may influence responses. My lack of experience as a qualitative researcher was also a limitation; to ameliorate this concern, I sought support from experienced qualitative researchers to ensure I employed sound methodological processes that support trustworthiness, consistency, and an appropriate degree of neutrality.

The researcher cannot assert that the results of this study apply to all PTs, PT students at different points in the educational process, and/or other contexts.

Recommendations for Further Research

A future longitudinal study design may be useful to determine if the changes and positive associations between confidence, value, and use are sustained in subsequent clinical practice. Refining the process of 'pairing' students and CIs on a CE may assist in exploring the research question that was not fully addressed, i.e. What PT student or CI characteristics are associated with or predictive of a change in attitudes or behaviors in STMs in their clinical partner after a clinical experience? The small number of linked student and CI responses in this study prevented a statistically sound exploration of this question. Additionally, exploring the study's research questions with a more diverse sample of participants would enhance the generalizability of the findings or may elucidate differences by clinical practice setting, geographic representation, gender, race, and ethnicity that were not broadly represented and captured in this study.

Research may also be beneficial to explore the impact of educational programs designed to (1) promote student confidence/self-efficacy and skills in the use of STMs, or (2) promote student skills in knowledge translation (knowledge broker), prior to CEs. Interventional programs would include teaching students skills to overcome or balance

the extra-organizational, organizational and individual level barriers that continue to impact STM use. Formal assessment of student self-confidence prior to and after the CE with a validated tool may provide valuable insight into change across different aspects of clinical learning, such as STMs, clinical reasoning, plan of care development, and more. There is no research identified that has addressed CI satisfaction in CE and EBP behavioral change associated with working with PT students that have been trained to be actively engaged as knowledge translation agents during their CEs.

Conclusion

This study provides evidence that STM confidence, value, and use are significantly associated for both PT students and CIs. A single CE has a positive impact on STM value for both groups and confidence change for PT students. Clinical focus area and clinical practice setting must be considered as significant factors impacting change in confidence in the selection of STMs over the course of a CE. A relationship exists between the number of students supervised, APTA membership status of CIs, and STM value and use constructs. Negative attitudes and beliefs about STMs persist and are consistent with the literature, although study participants had higher reports of STM value and use than found in earlier research. Organizational and extra-organizational requirements and mandates for the use of STMs positively influenced STM use and value in study participants; this was supported in both phases of the study. The qualitative data demonstrated five primary themes and twelve subthemes that were relatively consistent across groups. The qualitative data substantiates quantitative findings that, although STMs are perceived as important and valuable to clinical practice, barriers and concerns continue to persist. The 'ideal' characteristics of STMs reported by participants were

variable by clinical practice setting and patient/client population; these factors should be carefully considered by entities developing STM recommendations. Organizations should be cognizant of these setting and population factors as they encourage or mandate STM adoption. Clinician involvement in organizational decisions related to STMs, along with structured educational programs and EMR integration increase commitment and compliance with STM use. Students are valuable 'knowledge brokers', facilitating value, confidence, and use of EBP and STMs in practice. This study affirms that both clinical partners benefit from the CI-PT student partnership; clinical education promotes mutual learning and elevates evidence-based clinical practice.

APPENDICES

Appendix 1: Physical Therapist Student Electronic Survey

PT STUDENT SURVEY: Standardized Measures_ V4

Physical Therapist Student Electronic Survey

You are eligible to participate in this research study as a PT student on a terminal clinical education experience.

The purpose of this study: This study will explore the influence clinical instructor and PT student characteristics have on the use of standardized tests and measures and compare and contrast the standardized tests and measures students learn during their academic preparation to those commonly reported in clinical practice.

What to expect: Participation will involve completion of this survey which will take approximately 15-20 minutes to complete. The survey will collect de-identified demographic information and seek your response on questions related to the standardized tests and measures you have learned, the value you place on the use of standardized tests and measures, and your confidence in using these tools.

1. Informed Consent: Please click **I AGREE** in lieu of signature to participate in this study. Informed consent implies that you have received the recruitment email with detailed information and disclosures about this project and you are at least 18 years old.

◯ I AGREE

2. The Director of Clinical Education (DCE) coordinating this clinical experience will have provided you with an alphanumeric code to enter into the survey. This will link your deidentified survey to that of your clinical partner (your CI) while maintaining your confidentiality. **Please enter your code here. If you did not receive a code, please leave blank and proceed with the survey.**

3. Thank you for your willingness to complete this survey. Your time is greatly appreciated!

Documentation of Informed Consent to Participate in Research

Project Title: Influence of clinical instructor and physical therapist student characteristics on the use of standardized measures in clinical practice

Researcher(s): Vicki LaFay, PT, DPT, CSCS, CEEAA

Clarkson University Institutional Review Board (IRB) approval number: 17-38 Approval valid until: May 23, 2018

Nova Southeastern University Institutional Review Board (IRB) approval number: 2017-419 Approval valid until: June 29, 2018

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Appendix 2: Clinical Instructor Electronic Survey

CLINICAL INSTRUCTOR survey - Standardized measures V4

Physical Therapist Clinical Instructor Electronic Survey

You are eligible to participate in this research study as a clinical instructor for a PT student on a terminal clinical education experience.

The purpose of this study: This study will explore the influence clinical instructor and PT student characteristics have on the use of standardized tests and measures and compare and contrast the standardized tests and measures students learn during their academic preparation to those commonly reported in clinical practice.

What to expect: Participation will involve completion of this survey which will take approximately 15-20 minutes to complete. The survey will collect demographic information and seek your response on questions related to the standardized tests and measures you use, the value you place on the use of standardized tests and measures, and your reasons for using these tools.

1. Informed Consent: Please click **I AGREE** in lieu of signature to participate in this study. Informed consent implies that you have received the recruitment email with detailed information and disclosures about this project and you are at least 18 years old.

☐ I AGREE

2. The Director of Clinical Education (DCE) coordinating this clinical experience will have provided your student with an alphanumeric code for you to enter into the survey. This will link your deidentified survey to that of your clinical partner (your PT student) while maintaining your confidentiality. **Please enter your code here. If you did not receive a code, please leave blank and proceed with the survey.**

3. Thank you for your willingness to complete this survey. Your time is greatly appreciated!

Documentation of Informed Consent to Participate in Research

Project Title: Influence of clinical instructor and physical therapist student characteristics on the use of standardized measures in clinical practice

Researcher(s): Vicki LaFay, PT, DPT, CSCS, CEEAA

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Appendix 3: Survey Validation Rubric for Expert Panel
Survey Validation Rubric for Expert Panel - VREP©

By Marilyn K. Simon with input from Jacquelyn White, available at: http://dissertationrecipes.com/

Criteria	**Operational Definitions**	**Score** **1=Not Acceptable** (major modifications needed) **2=Below Expectations** (some modifications needed) **3=Meets Expectations** (no modifications needed but could be improved with minor changes) **4=Exceeds Expectations** (no modifications needed)				**Questions NOT meeting standard** **(List page <u>and</u> question number) and need to be revised.** ***Please use the comments and suggestions section to recommend revisions.***
		1	2	3	4	
Clarity	• The questions are direct and specific. • Only one question is asked at a time. • The participants can understand what is being asked.					

	• There are no *double-barreled* questions (two questions in one).					
Wordiness	• Questions are concise. • There are no unnecessary words					
Negative Wording	• Questions are asked using the affirmative (e.g., Instead of asking, "Which methods are not used?", the researcher asks, "Which methods *are* used?")					
Overlapping Responses	• No response covers more than one choice. • All possibilities are considered. • There are no ambiguous questions.					
Balance	• The questions are unbiased and do not lead the participants to a response. The questions are asked using a neutral tone.					
Use of Jargon	• The terms used are understandable by the target population. • There are no clichés or hyperbole in the wording of the questions.					
Appropriateness of Responses Listed	• The choices listed allow participants to respond appropriately. • The responses apply to all situations or offer a way for those to respond with unique situations.					

Use of Technical Language	• The use of technical language is minimal and appropriate. • All acronyms are defined.					
Application to Praxis	• The questions asked relate to the daily practices or expertise of the potential participants.					
Relationship to Problem	• The questions are sufficient to resolve the problem in the study • The questions are sufficient to answer the research questions. • The questions are sufficient to obtain the purpose of the study.					
Measure of Construct: **A: Perceived Value of standardized tests and measures**	• The survey adequately measures this construct. • Operational definition of "perceived value": an individual perspective of the relative worth, utility or importance					
Measure of Construct: **B: Use/Knowledge of standardized measures**	• The survey adequately measures this construct. • Operational definition of "use" is based on the frequency of selection, administration, and interpretation of standardized tests and measures in clinical practice/direct patient management. • Operational definition of "knowledge" is based on an awareness/understanding of the selection,					

	administration, and interpretation of standardized tests and measures in clinical practice/direct patient management.					
Measure of Construct: **C: Participant Demographic Characteristics**	• The survey adequately measures this construct. • Operational definition of demographic characteristics: data about the attributes of a population. In this study, this refers to the most pertinent demographic characteristics of CIs and PTs					
Measure of Construct: **D: Confidence**	• The survey adequately measures this construct • Operational definition of "confidence": belief in oneself and one's powers and abilities					

Comments and Suggestions

Appendix 4: Email Recruitment/Consent for Electronic Surveys
EMAIL RECRUITMENT/CONSENT FOR ELECTRONIC SURVEYS

The email request to DCEs to distribute to CIs:

I am seeking your assistance with my dissertation research project. I am hoping you will be willing to send out a recruitment email on my behalf to your PT students entering their terminal clinical experiences (all didactic coursework completed) this spring and one to their CIs.
The recruitment email will provide a link to an electronic survey, one specifically for CIs and another for students. I will also send you a code list to distribute to your students which will help associate them as part of your cohort and that will pair their responses to that of their CI while keeping this information deidentified to me, the researcher. I will have gift cards associated with the surveys and all that complete will be eligible to win one of 20 x $25 gift cards.

The purpose of this study is to explore the influence clinical instructor and PT student characteristics have on the use of standardized tests and measures and compare and contrast the standardized tests and measures students learn during their academic preparation to those commonly reported in clinical practice.

If you are willing to assist me, please indicate your interest and provide me with the timing of your spring clinicals and the size of that cohort via email to vlafay@clarkson.edu. I will send you the recruitment emails and codes during the final few weeks of the clinical experience for distribution and I will prompt you to reblast the request as a reminder at the end of the clinical experience.

I really and truly appreciate your consideration - I look forward to hearing from you!

This is a research project being conducted by Vicki LaFay, a PhD student in Physical Therapy at Nova Southeastern University and a faculty member at Clarkson University. If you have any questions about this research study, please contact Vicki LaFay, primary investigator: (315) 268-3787 or vlafay@clarkson.edu If you do not wish to receive any future communications regarding this research project or future research, please email or call Vicki LaFay.If you have questions about your rights as a research subject or if you wish to report any harm, injury, risk or other concern, please contact Dr. Johndan Johnson-Eilola, Chair of the Clarkson University Institutional Review Board (IRB) for human subjects research: (315) 268-6488 or johndan@clarkson.edu or Dr. William Smith, Director of the Nova Southeastern University Institutional Review Board (IRB) for human subjects research" (954) 262-5311or wsmith2@nova.edu .

If the DCE agreed to assist in recruitment, the following instructional emails were sent to DCEs:

Subject line: Recruitment email and instructions for clinical instructors only

FOR CIs ONLY:
For the CIs, copy and paste the following into an email to them. You can preface this with anything you think would be best- encourage them to have their perspectives considered through participation in the research, etc…, whatever type of encouragement you think would encourage them to jump on board. They are harder to get to do this sort of thing with how busy they are, for sure!
Each student will be responsible for giving their CI their student code from the table with codes you sent in the student recruitment email. Each CI will enter the student code into their survey so that I have the ability to see deidentified coded "pairs". THANK YOU!!!

SEND THIS IN THE BODY OF THE EMAIL TO CIs ONLY:
You are invited to participate in an online survey through Survey Monkey® on the influence clinical instructor (CI) and physical therapist (PT) student characteristics have on the use of standardized test and measures. You are eligible to participate in this research study as a CI for a PT student on a terminal clinical education experience.

SURVEY LINK: https://www.surveymonkey.com/r/9JGKG8M

Participation will involve completion of a survey that will take approximately 15 minutes or less to complete. The survey will collect basic demographic information as well as seek your response on questions related to your use, values and beliefs related to standardized tests and measures in clinical practice.

The Director of Clinical Education (DCE) coordinating this clinical experience has provided your student with a code for you to enter into your survey; this will link your deidentified survey to that of your student while maintaining confidentiality for both of you. For example, if your student indicates their student code was "A1", you will use that code in the survey as well. Your student will also be completing a survey but via a completely different link from the one provided to you.

PLEASE NOTE: Your student and their school will not have access to your survey responses.

In appreciation of your completion of the survey, you may enter a drawing for one of 20 $25 Amazon gift cards.

Participation in this research is voluntary. By completing the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without

penalty. You may skip questions you are uncomfortable with while taking the survey or withdrawal from the survey all together. Survey Monkey will not collect identifying information such as your email or IP address and your responses to this survey will remain confidential.

A potential benefit of participating is that you may become aware of your perceptions and behaviors associated with using standardized measures in clinical practice. Knowledge gained from this study may provide a clearer picture of the current state of standardized measure utilization in PT practice, guide efforts to advance standardized measure use, and aid academic programs in establishing priorities and teaching strategies for standardized measure education for entry-level practice. The researchers have no financial interest in performing this study.

THANK YOU SO MUCH!
Vicki LaFay PT, DPT, CSCS, CEEAA

This is a research project being conducted by Vicki LaFay, a PhD student in Physical Therapy at Nova Southeastern University and a faculty member at Clarkson University. If you have any questions about this research study, please contact Vicki LaFay, primary investigator: (315) 268-3787 or vlafay@clarkson.edu If you do not wish to receive any future communications regarding this research project or future research, please email or call Vicki LaFay.If you have questions about your rights as a research subject or if you wish to report any harm, injury, risk or other concern, please contact Dr. Johndan Johnson-Eilola, Chair of the Clarkson University Institutional Review Board (IRB) for human subjects research: (315) 268-6488 or johndan@clarkson.edu or Dr. William Smith, Director of the Nova Southeastern University Institutional Review Board (IRB) for human subjects research" (954) 262-5311or wsmith2@nova.edu .

Subject Line: Recruitment email and instructions for students on final clinical only

I cannot thank you enough for your willingness to help me with my research! Here are the instructions in italics and below the line is what you will copy and paste into an email for your ***students on a final clinical****. If you can send this out now, that would be wonderful and we can do a follow up reminder in the next few weeks.*

For the students, copy and paste the following into an email to them. You can preface this with anything you want - I think it really helps with responses if you encourage them to have their perspectives considered through participation in the survey research, etc…, whatever type of encouragement you think would encourage them to jump on board!

You will need to provide the group their codes from the following list- ***all you have to do is add their names in the column for "Student name" so they know what code they should enter when they do the survey****. Each student will be responsible for giving their CI their student code. Each CI will enter the student code into their unique survey link so that I can compare deidentified coded "pairs" in analysis. THANK YOU!!!*

SEND THIS IN THE BODY OF THE EMAIL TO STUDENTS ONLY:

You are invited to participate in an online survey through Survey Monkey® on the influence clinical instructor (CI) and physical therapist (PT) student characteristics have on the use of standardized test and measures. You are eligible to participate in this research study as a PT student on a terminal clinical education experience.

SURVEY LINK: https://www.surveymonkey.com/r/99ZFW89

Participation will involve completion of a survey that will take approximately 15-20 minutes to complete. The survey will collect basic demographic information as well as seek your response on questions related to the standardized tests and measures you have learned, the value you place on the use of standardized tests and measures, and your confidence in utilizing these tools.

The Director of Clinical Education (DCE) coordinating this clinical experience has provided you with a code (BELOW) to enter into your survey; this will link your deidentified survey to that of your clinical instructor while maintaining your confidentiality. You will provide your CI with this code. Your CI will receive a link to a completely different survey and will use this code to identify themselves as your clinical "partner".

PLEASE NOTE: Your CI and your school will not have access to your survey responses.

In appreciation of your completion of the survey, you may enter a drawing for one of 20 $25 Amazon gift cards.

STUDENT CODE STUDENT NAME
N1
N2

Participation in this research is voluntary. By completing the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty. You may skip questions you are uncomfortable with while taking the survey or withdrawal from the survey all together. Survey Monkey will not collect identifying information such as your email or IP address and your responses to this survey will remain confidential.

A potential benefit of participating is that you may become aware of your perceptions and behaviors associated with using standardized measures in clinical practice. Knowledge gained from this study may provide a clearer picture of the current state of standardized measure utilization in PT practice, guide efforts to advance standardized measure use, and aid academic programs in establishing priorities and teaching strategies for standardized measure education for entry-level practice. The researchers have no financial interest in performing this study.

This is a research project being conducted by Vicki LaFay, a PhD student in Physical Therapy at Nova Southeastern University and a faculty member at Clarkson University.

If you have any questions about this research study, please contact Vicki LaFay, primary investigator: (315) 268-3787 or vlafay@clarkson.edu If you do not wish to receive any future communications regarding this research project or future research, please email or call Vicki LaFay.If you have questions about your rights as a research subject or if you wish to report any harm, injury, risk or other concern, please contact Dr. Johndan Johnson-Eilola, Chair of the Clarkson University Institutional Review Board (IRB) for human subjects research: (315) 268-6488 orjohndan@clarkson.edu or Dr. William Smith, Director of the Nova Southeastern University Institutional Review Board (IRB) for human subjects research" (954) 262-5311 or wsmith2@nova.edu .

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Appendix 5: Tables and Figures

Table 43. Item-Total Statistics for Clinical Instructor Survey Construct of Attitudes and Behaviors: Rationale for Use

Standardized tests and measures...	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Help direct the plan of care	24.43	28.11	.57	.95	.76
enhance communication between the therapist and patient/client	24.29	35.14	-.19	.90	.81
enhance communication with physicians and other healthcare providers	24.50	29.35	.48	.87	.77
help patients/clients feel that their therapists are thorough in examination	24.36	28.09	.47	.78	.77
increase efficiency of examinations	24.93	28.38	.49	.87	.77
attain better patient/client outcomes	24.79	27.72	.68	.84	.75
Help motivate and encourage patients/clients	24.71	29.76	.50	.78	.77
enhance communication and/or decrease rates of denial from third-party payors	24.71	29.30	.48	.94	.77
enhance marketing of practice/services	25.21	28.95	.63	.93	.76
Are mandated/required for all patients/clients	24.71	26.07	.48	.95	.77
Are mandated/required for patients/clients with certain types of conditions	24.79	28.80	.29	.96	.80

Total (n=14) Cronbach's alpha=.790

Table 44. Item-Total Statistics for Clinical Instructor Survey Construct of Attitudes and Behaviors: Attitudes

Standardized measures...	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Are confusing to patients/clients	28.54	18.93	-.54	.52
Are easy for patients/clients to complete independently	29.54	12.77	.37	.29
Are at an appropriate reading level for most patients/clients	28.62	14.26	.24	.35
Are in a language in which many of my patients/clients are not fluent	28.31	18.40	-.37	.54
Are not sensitive to culture/ethnic concerns of many patients/clients	28.46	14.94	.05	.41
Make patients/clients anxious	29.38	14.26	.25	.35
Take too much time to administer	29.38	11.92	.40	.26
Are easy to analyze/calculate/score	28.23	14.19	.30	.34
Provide useful information	27.92	16.08	-.03	.41
Require more effort than they are worth	28.46	11.27	.63	.18
Contain information that helps to direct the plan of care	28.23	13.03	.45	.28
Are difficult to interpret	28.62	15.42	-.02	.43
Do not contain the types of items or questions that are relevant for the type of patients/clients I see	29.23	13.53	.17	.37

Total (n=14) Cronbach's alpha=.396

Table 45. Item-Total Statistics for Physical Therapist Student Influence on Clinical Instructor Standardized Tests and Measures

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I am using standardized tests and measures…frequency	2.31	.56	.27	.29	.46
My confidence in using standardized tests and measures…	2.31	.40	.24	.16	.65
I am using standardized measures for…reasons	2.46	.60	.60	.39	.17

Total (n=3) Cronbach's alpha=.493

Table 46. Item-Total Statistics for PT Student Standardized Tests and Measures: Construct of Confidence Prior to Experience

How confident were you in your ability to…	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
q11 select the most appropriate standardized tests and measures for patients in this setting *prior* to this clinical experience	7.10	2.10	.76	.60	.68
q13 administer the standardized tests and measures you learned in your academic coursework for patients in this setting *prior* to this clinical experience	7.30	2.23	.69	.53	.76
q15 interpret the standardized tests and measures you learned in your academic coursework for patients in this setting *prior* to this clinical experience	7.00	2.44	.60	.38	.84

Total (n=10) Cronbach's alpha=.827

Table 47. Item-Total Statistics for Physical Therapist Student Standardized Tests and Measures Construct of Value

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
q17 How valuable are standardized tests and measures to physical therapist clinical practice	6.10	1.21	.69	.68	.44
q18 How valuable do you feel standardized tests and measures are to the clinical practice where you are currently completing your clinical experience	6.30	.90	.68	.68	.40
q19 I value the use of standardized tests and measures…	8.00	1.56	.28	.08	.89

Total (n=10) Cronbach's alpha=.708

Figure 4. Preliminary Qualitative Conceptual Framework

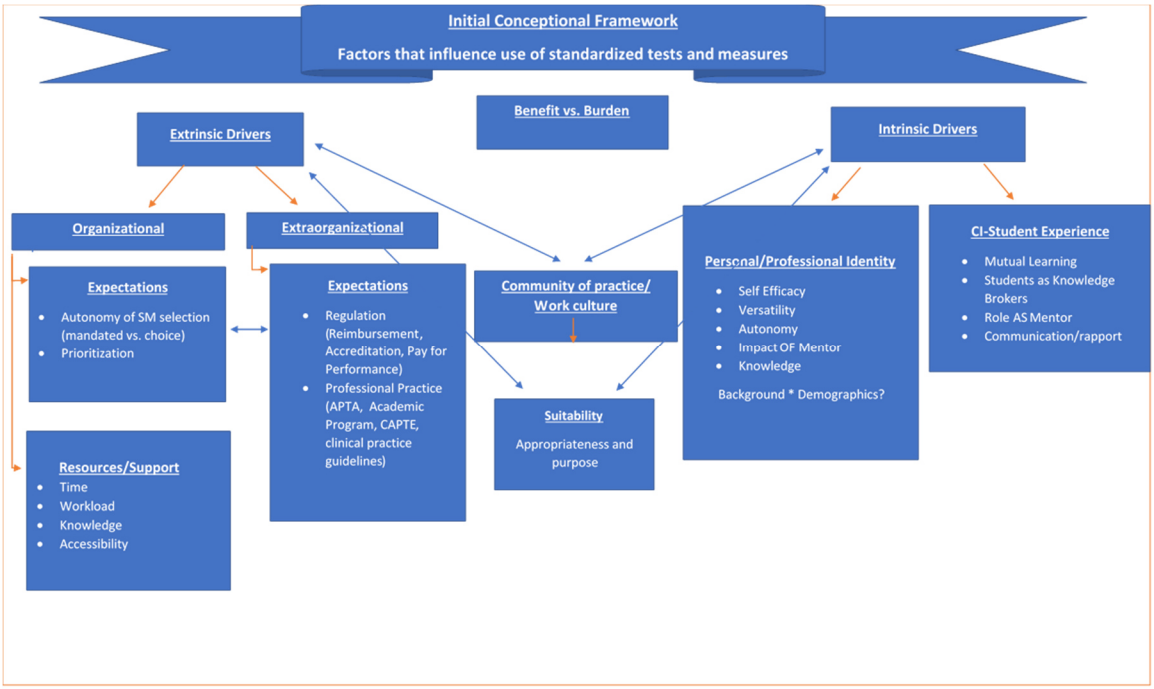


Table 48. Clinical Instructor Use of Standardized Tests and Measures in Acute Care

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
6-Minute Walk Test (6MWT)	91	31(34.1)	25(27.5)	21(23.1)	14(15.4)
10-Meter Walk Test (10MWT)	84	46(54.8)	15(17.6)	10(11.9)	12(14.3)
Action Research Arm Test (ARAT)	73	68(93.2)	3(4.1)	1(1.4)	1(1.4)
Activity Measure for Post-Acute Care (AM-PAC)	76	59(77.6)	4(5.3)	1(1.3)	12(15.8)
Acute Care Index of Function (ACIF)	71	67(94.4)	4(5.6)	0	0
Barthel Index (BI)	75	65(86.7)	5(6.7)	5(6.7)	0
Bayley Infant Neurodevelopmental Screener (BINS)	71	66(93.0)	3(4.2)	2(2.8)	0
Borg Rating of Perceived Exertion (RPE)	89	26(29.2)	16(18.0)	29(32.6)	18(20.2)
Chronic Respiratory Disease Questionnaire (CRDQ)	68	66(97.1)	2(2.9)	0	0
CRIES Scale	71	68(95.8)	2(2.8)	1(1.4)	0
Early Activity Scale for Endurance (EASE)	70	66(94.3)	4(5.7)	0	0
Energy Expenditure Index	70	65(92.9)	4(5.7)	1(1.4)	0
Faces Pain Scale	84	26(31.0)	18(21.4)	20(23.8)	20(23.8)
Functional Independence Measure (FIM)	80	43(53.8)	10(12.5)	10(12.5)	17(21.3)
Function in Sitting Test (FIST)	71	56(78.9)	7(9.9)	8(11.3)	0
Modified Medical Research Council Questionnaire for COPD	71	69(97.2)	2(2.8	0	0
Movement Assessment of Infants (MAI)	73	70(95.9)	3(4.1)	0	0
Short Form Health Survey of the Medical Outcome Study (SF-36)	78	66(52.0)	5(6.4)	6(7.7)	1(1.3)
St. George Respiratory Questionnaire (SGRQ)	69	66(95.7)	3(4.3)	0	0
Timed Up and Go (TUG)	90	8(8.9)	21(23.3)	27(30.0)	34(37.8)
Tinetti Mobility Scale	83	35(42.2)	16*(19.3)	18(21.7)	14(16.9)
UCSD Shortness of Breath Questionnaire (SOBQ)					

N(%)=number of item responses (Valid Percent) Total= total number of respondents.
*Learned from a student (n=1)

Table 49. Physical Therapist Student Knowledge/use of Standardized Tests and Measures in Acute Care

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population
6-Minute Walk Test (6MWT)	114	108(94.7)	21(18.4)	30(26.3)
10-Meter Walk Test (10MWT)	96	85(88.5)	16(16.7)	14(14.6)
Action Research Arm Test (ARAT)	33	33(100.0)	0	0
Activity Measure for Post-Acute Care (AM-PAC)	38	25(65.8)	13(34.2)	13(34.2)
Acute Care Index of Function (ACIF)	19	18(94.7)	1(5.3)	1(5.3)
Barthel Index (BI)	68	66(97.1)	4(5.9)	5(7.4)
Bayley Infant Neurodevelopmental Screener (BINS)	28	28(100.0)	1(3.6)	1(3.6)
Borg Rating of Perceived Exertion (RPE)	109	102(93.6)	18(16.5)	43(39.5)
Chronic Respiratory Disease Questionnaire (CRDQ)	18	18(100.0)	0	1(5.6)
CRIES Scale	19	16(84.2)	4(21.1)	1(5.3)
Early Activity Scale for Endurance (EASE)	6	6(100.0)	0	0
Energy Expenditure Index	16	14(87.5)	3(18.8)	0
Faces Pain Scale	91	85(93.4)	17(18.7)	28(30.8)
Functional Independence Measure (FIM)	101	87(86.1)	29(28.7)	35(34.7)
Function in Sitting Test (FIST)	51	47(92.2)	7(13.7)	5(9.8)
Modified Medical Research Council Questionnaire for COPD	10	9(90.0)	2(20.0)	0
Movement Assessment of Infants (MAI)	22	20(90.9)	3(13.64)	2(9.1)
Short Form Health Survey of the Medical Outcome Study (SF-36)	73	71(97.3)	6(8.2)	3(4,1)
St. George Respiratory Questionnaire (SGRQ)	8	8(100.0)	0	0
Timed Up and Go (TUG)	113	104(92.0)	36(31.9)	53(46.9)
Tinetti Mobility Scale	103	93(90.3)	28(27.2)	36(35.0)
UCSD Shortness of Breath Questionnaire (SOBQ)	12	12(100.0)	1(8.3)	0

N(%)=number of item responses (Valid Percent) Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 50. Clinical Instructor Use of Cardiovascular and Pulmonary Standardized Tests and Measures

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
6-Minute Walk Test (6MWT)	85	28(32.9)	20(23.5)	20(23.5)	17(20.0)
10-Meter Walk Test (10MWT)	78	46(59.0)	8(10.3)	12.8*(14.1)	12(15.4)
Borg Rating of Perceived Exertion (RPE)	83	27(32.5)	14(16.9)	23(27.7)	19(22.9)
Modified Borg Scale	77	44(57.1)	5(6.5)	18(23.4)	10(13.0)
Claudication Scale	66	60(90.9)	2(3.0)	1(1.5)	3(4.5)
Chronic Respiratory Disease Questionnaire (CRDQ)	64	62(96.9)	2(3.1)	0	0
Functional Independence Measure (FIM)	75	47(62.7)	8(10.7)	5(6.7)	15(20.0)
Modified Chair Step Test	67	59(88.1)	4(6.0)	3*(4.5)	1(1.5)
Modified Medical Research Council Questionnaire for COPD	65	63(96.9)	2(3.1)	0	0
Short Form Health Survey of the Medical Outcome Study (SF-36)	67	60(89.6)	4(6.0)	3(4.5)	0
St. George Respiratory Questionnaire (SGRQ)	62	60(96.8)	2(1.6)	0	0
Timed Up and Go (TUG)	85	12(14.1)	14(16.5)	26(30.6)	33(38.8)
UCSD Shortness of Breath Questionnaire (SOBQ)	61	59(96.7)	2(3.3)	0	0

Total= total number of respondents. N(%)=number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 51. Physical Therapist Student Knowledge/use of Cardiovascular and Pulmonary Standardized Tests and Measures

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this setting/ population
6-Minute Walk Test (6MWT)	110	103(93.6)	20(18.2)	32(29.1)
10-Meter Walk Test (10MWT)	85	78(91.8)	15(17.7)	13(15.3)
Berg Balance Scale (BBS)	106	99(93.4)	29(27.4)	44(41.5)
Borg Rating of Perceived Exertion (RPE)	107	101(94.4)	19(17.8)	37(34.6)
Modified Borg Scale	80	77(96.3)	12(15)	20(25)
Claudication Scale	64	64(100.0)	2(3.1)	1(1.6)
Chronic Respiratory Disease Questionnaire (CRDQ)	12	12(100.0)	1(8.3)	0
Functional Independence Measure (FIM)	98	89(90.8)	23(23.5)	24(24.5)
Modified Chair Step Test	29	29(100.0)	0	0
Modified Medical Research Council Questionnaire for COPD	8	7(87.5)	1(12.5)	0
Short Form Health Survey of the Medical Outcome Study (SF-36)	66	65(98.5)	3(4.6)	2(3.0)
St. George Respiratory Questionnaire (SGRQ)	6	6(100.0)	0	0
Timed Up and Go (TUG)	107	100(93.5)	29(27.1)	46(43.0)
UCSD Shortness of Breath Questionnaire (SOBQ)	8	8(100.0)	1(12.5)	0

N(%)=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 52. Clinical Instructor Use of Standardized Tests and Measures in Geriatrics and Home Health

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
6-Minute Walk Test (6MWT)	81	31(38.3)	18(22.2)	18(22.2)	14(17.3)
10-Meter Walk Test (10MWT)	79	42(53.2)	11(13.9)	12(15.2)	13(16.5)
Berg Balance Scale (BBS)	82	19(23.2)	14(17.1)	26(31.7)	23(28.0)
Continuous Scale Physical Functional Performance (CS-PFP)	61	59(96.7)	2(3.3)	0	0
Craig Hospital Inventory of Environmental Factors (CHIEF)	61	59(96.7)	2(3.3)	0	0
Disabilities of the Arm, Shoulder and Hand Scale (DASH)	77	39(50.6)	7(9.1)	11(14.3)	20(26.0)
Disabilities of the Arm, Shoulder and Hand Scale (QuickDASH)	81	43(53.1)	6(7.4)	8(9.9)	24(29.6)
Elderly Mobility Scale (EMS)	63	60(95.2)	2(3.2)	0	1(1.6)
Falls Efficacy Scale-International (FES-I)	66	54(81.8)	9(13.6)	3(4.5)	0
Falls Risk Assessment Tool (FRAT)	66	59(89.4)	3(4.5)	3(4.5)	1(1.5)
Fear Avoidance Beliefs Questionnaire (FABQ)	74	36(48.6)	18(24.3)	10(13.5)	10(13.5)
Five Times Sit to Stand (FTSTS)	79	37(46.8)	8(10.1)	17(21.5)	16(20.3)
Fullerton Advanced Balance Scale (FAB)	65	60(92.3)	5(7.7)	0	0
Geriatric Depression Scale	65	57(87.7)	4(6.2)	4(6.2)	0
Knee Society Score (KSS) for Total Knee Replacement	64	58(90.6)	3(4.7)	2(3.1)	1(1.6)
Lower Extremity Functional Scale (LEFS)	80	28(35.0)	6(7.5)	12(15.0)	34(42.5)
Medical Outcomes Short Study Form-36 (SF-36)	64	55(85.9)	5(7.8)	3(4.7)	1(1.6)
Patient Specific Functional Scale (PSFS)	73	48(65.8)	10(13.7)	9*(12.3)	6(8.2)
Sitting Balance Scale (SBS)	65	60(92.3)	2(3.1)	1(1.5)	2(3.1)
Timed Up and Go (TUG)	87	10(11.5)	15(17.2)	29(33.3)	33(37.9)
Trunk Muscle Power and Endurance	62	60(96.8)	2(3.2)	0	0

Total= total number of respondents. N(%)=number of item responses (Valid Percent)
*Learned from a student (n=2)

Table 53. Physical Therapist Student Use/knowledge of Standardized Tests and Measures in Geriatrics and Home Health

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population/ setting
6-Minute Walk Test (6MWT)	104	97(93.3)	22(21.1)	31(29.8)
10-Meter Walk Test (10MWT)	83	78(93.9)	11(13.3)	17(20.5)
Berg Balance Scale (BBS)	101	94(93.1)	22(21.8)	42(41.6)
Continuous Scale Physical Functional Performance (CS-PFP)	7	6(85.7)	0	1(14.3)
Craig Hospital Inventory of Environmental Factors (CHIEF)	5	5(100.0)	0	0
Disabilities of the Arm, Shoulder and Hand Scale (DASH)	99	91(91.9)	25(25.3)	42(42.4)
Disabilities of the Arm, Shoulder and Hand Scale (QuickDASH)	86	75(87.2)	22(25.6)	33(38.4)
Elderly Mobility Scale (EMS)	15	12(80.0)	2(13.3)	2(13.3)
Falls Efficacy Scale-International (FES-I)	27	25(92.6)	6(22.2)	7(25.9)
Falls Risk Assessment Tool (FRAT)	31	28(90.3)	7(22.6)	6(19.4)
Fear Avoidance Beliefs Questionnaire (FABQ)	88	82(93.2)	17(19.3)	23(26.1)
Five Times Sit to Stand (FTSTS)	78	69(88.5)	29(37.2)	37(47.4)
Fullerton Advanced Balance Scale (FAB)	18	17(94.4)	2(11.1)	1(5.6)
Geriatric Depression Scale	36	31(86.1)	22.2(8)	5.6(2)
Knee Society Score (KSS) for Total Knee Replacement	10	7(70.0)	1(10.0)	2(20.0)
Lower Extremity Functional Scale (LEFS)	93	83(89.3)	31(33.3)	49(52.7)
Medical Outcomes Short Study Form-36 (SF-36)	53	51(96.2)	6(11.3)	5(9.4)
Patient Specific Functional Scale (PSFS)	42	39(92.9)	10(23.8)	14(33.3)
Sitting Balance Scale (SBS)	36	32(88.9)	5(13.9)	4(11.1)
Timed Up and Go (TUG)	104	98(94.2)	31(29.8)	55(52.9)
Trunk Muscle Power and Endurance	11	10(90.9)	1(9.1)	0

N=number of item responses (Valid Percent) Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 54. Clinical Instructor Use of Standardized Tests and Measures in Hand Rehabilitation

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
Boston Carpal Tunnel Instrument	53	52(98.1)	1(1.9)	0	0
Disabilities of the Arm, Shoulder and Hand Scale (DASH)	69	35(50.7)	8(11.6)	6(8.7)	20(29.0)
Disabilities of the Arm, Shoulder and Hand Scale (QuickDASH)	71	36(50.7)	7(9.9)	6(8.5)	22(31.0)
Michigan Hand Outcomes Questionnaire	53	52(98.1)	1(1.9)	0	0
Patient-Rated Elbow Evaluation (PREE)	54	51(94.4)	1(1.9)	1(1.9)	1(1.9)
Patient-Rated Wrist Evaluation	52	50(96.2)	1(1.9)	0	1(1.9)
Patient-Rated Form of the American Shoulder and Elbow Surgeons' Questionnaire (pASES-e)	54	53(98.1)	1(1.9)	0	0
Patient Specific Functional Scale (PSFS)	62	45(72.6)	8(12.9)	4*(6.5)	5(3.9)
Upper Limb Functional Index	59	50(84.7)	1(1.7)	2(3.4)	6(10.2)

Total= total number of respondents. N=number of item responses (Valid Percent)
*Learned from a student (n=2)

Table 55. Physical Therapist Student Knowledge/use of Standardized Tests and Measures in Hand Rehabilitation

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population/ setting
Boston Carpal Tunnel Instrument	6	6(100.0)	0	0
Disabilities of the Arm, shoulder and hand scale (DASH)	97	89(91.8)	26(26.8)	32(33.0)
Disabilities of the arm, Shoulder and Hand Scale (QuickDASH)	82	72(87.8)	22(26.8)	28(34.2)
Michigan Hand Outcomes Questionnaire	4	4(100.0)	0	0
Patient-Rated Elbow Evaluation (PREE)	3	3(100.0)	0	0
Patient-Rated Wrist Evaluation	2	2(100.0)	0	0
Patient-Rated Form of the American Shoulder and Elbow Surgeons' Questionnaire (pASES-e)	2	2(100.0)	0	0
Patient Specific Functional Scale (PSFS)	35	33(94.3)	7(20.0)	8(22.9)
Upper Limb Functional Index	34	28(82.4)	9(26.5)	9(26.5)

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 56. Clinical Instructor Use of Orthopedic/Musculoskeletal Standardized Tests and Measures

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
10-Meter Walk Test (10MWT)	84	43(51.2)	16(19.0)	11(13.1)	13(15.5)
Achilles Tendon Palpation Test	79	44(55.7)	7(8.9)	14(17.7)	14(17.7)
Amputee Mobility Predictor No Prosthesis (AMPnoPro)	70	62(88.6)	1(1.4)	2(2.9)	5(7.1)
Amputee Mobility Predictor Prosthesis (AMPPro)	71	61(85.9)	3(4.2)	1(1.4)	6(4.7)
Ankle Dorsiflexion Range of Motion	91	12(13.2)	2(2.2)	14(15.4)	63(69.2)
Ankle Plantar Function Endurance Test	73	45(61.6)	4(5.5)	8(11.0)	16(21.9)
Anterior Drawer Test	90	21(23.3)	14(15.6)	16(17.8)	39(43.3)
Arc Sign	75	40(53.3)	8(10.7)	3(4.0)	24(32.0)
Comprehensive High Level Activity Mobility Predictor (CHAMP)	66	64(97.0)	2(3.0)	0	0
Counter Movement Jump-Achilles Tendinitis	67	60(89.6)	3(4.5)	3(4.5)	1(1.5)
Disabilities of the Arm, Shoulder and Hand Scale (DASH)	85	43(50.6)	9(10.6)	9(10.6)	24(28.2)
Disabilities of the Arm, Shoulder and Hand Scale (QuickDASH)	82	39(47.6)	6(7.3)	5(6.1)	32(39.0)
Drop Counter Movement Jump (CMJ)-achilles tendinitis	65	59(90.8)	2(3.1)	3(4.6)	1(1.5)
Dynamic Gait Index (DGI)	84	39(46.4)	14(16.7)	12(14.3)	19(22.6)
Fear Avoidance Beliefs Questionnaire (FABQ)	79	40(50.6)	14(17.7)	12(15.2)	13(16.5)
Five Times Sit to Stand (FTSTS)	87	33(37.9)	16(18.4)	20*(23.0)	18(20.7)
Foot and Ankle Ability Measure (FAAM)	72	57(79.2)	4(5.6)	6(8.3)	5(6.9)
Forefoot Alignment Measurement	74	56(75.7)	6(8.1)	6(8.1)	6(8.1)
Functional Independence Measure (FIM)	75	51(68.0)	8(10.7)	6(8.0)	10(13.3)
Gastrocnemius Stretch	81	23(28.4)	8(9.9)	15*(18.5)	35(43.2)
Hip Outcome Score	69	55(79.7)	2(2.9)	8(11.6)	4(5.8)
International Knee Documentation Committee(IKDC) Subjective Knee Evaluation Form	68	64(94.1)	1(1.5)	2(2.9)	1(0.8)

Table 56. Clinical Instructor Use of Orthopedic/Musculoskeletal Standardized Tests and Measures (continued)

Knee Injury and Osteoarthritis Outcome Score (KOOS)	72	60(83.3)	3(4.2)	6(8.3)	3(4.2)
Knee Outcome Survey Activities of Daily Living Scale (KOS-ADLS)	70	59(84.3)	3(4.3)	5(7.1)	3(4.3)
Knee Society Score (KSS)	65	62(95.4)	1(1.5)	2(3.1)	0
Lachman Test	88	19(21.6)	17(19.3)	12(13.6)	40(45.5)
Low Dye Taping Technique	72	51(70.8)	9(12.5)	6(8.3)	6(8.3)
Lower Extremity Functional Scale (LEFS)	86	27(31.4)	5(5.8)	11(12.8)	43(50.0)
Medical Outcomes Short Study Form-36 (SF-36)	71	58(81.7)	5(7.0)	4(5.6)	4(5.6)
Modified Low Back Pain Disability Questionnaire	79	41(51.9)	6(7.6)	4(5.1)	28(35.4)
Neck Disability Index (NDI)	87	29(33.3)	6(6.9)	8(9.2)	44(50.6)
Observational Gait Analysis	86	18(20.9)	5(5.8)	11(12.8)	52(60.5)
Patient Specific Functional Scale (PSFS)	80	47(58.8)	11*(13.8)	10(12.5)	12(15.0)
Pivot Shift Test- ACL	81	38(46.9)	18(22.2)	11(13.6)	14(17.3)
Royal London Test	64	62(96.9)	1(1.6)	1(1.6)	0
Single Limb Hop Test-Achilles Tendinitis	71	43(60.6)	10(14.1)	8(11.3)	10(14.1)
Subtalar Joint Neutral Non-Weight Bearing Test	70	40(57.1)	8(11.4)	7(10.0)	15(21.4)
Subtalar Joint Neutral Standing Test	74	38(51.4)	11(14.9)	8(10.8)	17(23.0)
Subtalar Joint ROM	78	28(35.9)	11(14.1)	11(14.1)	28(35.9)
Talocrural Joint Posterior Glide Test	79	31(39.2)	14*(17.7)	8(10.1)	25(31.6)
Tear Drop Taping Technique	69	55(79.7)	4(5.8)	3(4.3)	7(10.1)
Thompson Test	84	28(33.3)	19(22.6)	9(10.7)	28(33.3)
Timed Up and Go (TUG)	91	11(12.1)	19(20.9)	23(25.3)	38(41.8)
Truncated Arch-Height Ratio	63	60(95.2)	1(1.6)	1(1.6)	1(1.6)
Trunk Muscle Power and Endurance	68	53(77.9)	6(8.8)	5(7.4)	4(5.9)
Unilateral Concentric and Eccentric Heel Raises	72	40(55.6)	5(6.9)	15(20.8)	12(16.7)
Victorian Institute of Sports Assessment (VISA-A)	64	62(96.9)	2(3.1)	0	0

Total= total number of respondents. N=number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 57. PT Student Knowledge/use of Orthopedic/Musculoskeletal Standardized Tests and Measures

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population/ setting
10-Meter Walk Test (10MWT)	88	83(94.3)	13(14.8)	18(20/5)
Achilles Tendon Palpation Test	44	42(95.5)	9(20.5)	16(36.4)
Amputee Mobility Predictor No Prosthesis (AMPnoPro)	35	29(82.9)	5(14.3)	4(11.4)
Amputee Mobility Predictor Prosthesis (AMPPro)	39	33(84.6)	6(15.4)	4(10.3)
Ankle Dorsiflexion Range of Motion	82	76(92.7)	18(22.0)	57(69.5)
Ankle Plantar Function Endurance Test	50	47(94.0)	8(16.0)	20(40.0)
Anterior Drawer Test	102	95(93.1)	26(25.5)	62(60.8)
Arc Sign	48	39(81.3)	10(20.8)	25(52.1)
Comprehensive High Level Activity Mobility Predictor (CHAMP)	4	4(100.0)	0	0
Counter Movement Jump-Achilles Tendinitis	10	7(70.0)	3(30.0)	0
Disabilities of the Arm, Shoulder and Hand Scale (DASH)	105	95(90.5)	26(24.8)	51(48.6)
Disabilities of the Arm, Shoulder and Hand Scale (QuickDASH)	89	78(87.5)	20(22.5)	41(46.1)
Drop Counter Movement Jump (CMJ)- achilles tendinitis	9	8(88.9)	1(11.1)	0
Dynamic Gait Index (DGI)	98	92(93.9)	20(20.4)	38(38.8)
Fear Avoidance Beliefs Questionnaire (FABQ)	86	80(93.0)	15(17.4)	25(29.1)
Five Times Sit to Stand (FTSTS)	78	69(88.5)	24(30.8)	36(46.2)
Foot and Ankle Ability Measure (FAAM)	30	27(90.0)	5(16.7)	4(13.3)
Forefoot Alignment Measurement	28	24(85.7)	4(14.3)	5(17.9)
Functional Independence Measure (FIM)	91	83(91.2)	20(22.0)	22(24.2)
Gastrocnemius Stretch	74	67(90.5)	16(21.6)	49(66.2)
Hip Outcome Score	21	15(71.4)	6(28.6)	8(38.1)
International Knee Documentation Committee(IKDC) Subjective Knee Evaluation Form	13	12(92.3)	1(7.7)	3(23.1)
Knee Injury and Osteoarthritis Outcome Score (KOOS)	43	35(81.4)	11(25.6)	9(20.9)

Table 57. PT Student Knowledge/use of Orthopedic/Musculoskeletal Standardized Tests and Measures (continued)

Knee Outcome Survey Activities of Daily Living Scale (KOS-ADLS)	19	17(89.5)	2(10.5)	1(5.3)
Knee Society Score (KSS)	10	9(90.0)	1(10.0)	0
Lachman Test	105	98(93.3)	20(19.1)	58(55.3)
Low Dye Taping Technique	32	28(87.5)	5(15.6)	12(37.5)
Lower Extremity Functional Scale (LEFS)	92	82(89.1)	24(26.1)	57(62.0)
Medical Outcomes Short Study Form-36 (SF-36)	56	55(98.2)	5(8.9)	8(14.3)
Modified Low Back Pain Disability Questionnaire	78	72(92.3)	15(19.2)	35(44.9)
Neck Disability Index (NDI)	97	85(87.6)	26(26.8)	58(59.8)
Observational Gait Analysis	80	71(88,8)	21(26.3)	56(70.0)
Patient Specific Functional Scale (PSFS)	47	41(87.2)	10(21.3)	13(27.7)
Pivot Shift Test- ACL	73	66(90.4)	10(13.7)	29(39.7)
Royal London Test	3	3(100.0)	1(33.3)	0
Single Limb Hop Test-Achilles Tendinitis	38	31(81.6)	8(21.1)	12(31.6)
Subtalar Joint Neutral Non-Weight Bearing Test	53	51(96.2)	4(7.6)	16(30.2)
Subtalar Joint Neutral Standing Test	58	56(96.6)	5(8.6)	14(24.1)
Subtalar Joint ROM	80	77(96.3)	10(12.5)	32(40.0)
Talocrural Joint Posterior Glide Test	66	59(89.4)	15(22.7)	31(47.0)
Tear Drop Taping Technique	23	15(65.2)	6(26.1)	9(39.1)
Thompson Test	91	86(94.5)	15(16.5)	37(40.7)
Timed Up and Go (TUG)	105	96(91.4)	28(26.7)	58(55.2)
Truncated Arch-Height Ratio	8	7(87.5)	0	2(25.0)
Trunk Muscle Power and Endurance	20	18(90.0)	2(10.0)	2(10.0)
Unilateral Concentric and Eccentric Heel Raises	38	34(89.5)	7(18.4)	21(55.3)
Victorian Institute of Sports Assessment (VISA-A)	8	7(87.5)	1(12.5)	0

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item

Table 58. Clinical Instructor Use of Neurological Standardized Tests and Measures

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
2-Minute Walk Test (2MWT)	64	44(68.8)	10(15.6)	5(7.8)	5(7.8)
6-Minute Walk Test (6MWT)	73	27(37.0)	19(26.0)	13(17.8)	14(19.2)
9-Hole Peg Test	62	56(90.3)	5(8.1)	0	1(1.6)
10-Meter Walk Test (10MWT)	68	39(57.4)	11(16.2)	6*(8.8)	12(17.6)
12-Item Multiple Sclerosis Walking Scale (MSWS-12)	56	53(94.6)	3(2.4)	0	0
360 Degree Turn Stand	58	44(75.9)	5(8.6)	7(12.1)	2(3.4)
Activity-Specific Balance Confidence Scale (ABC)	61	42(68.9)	7(11.5)	7(11.5)	5(8.2)
Action Reaction Arm Test (ARAT)	56	53(94.6)	2(3.6)	0	1(1.8)
Agitated Behavior Scale	57	51(89.5)	4(7.0)	1(1.8)	1(1.8)
Balance Error Scoring System (BESS)	56	49(87.5)	6(10.7)	1(1.8)	0
Barthel Index	61	52(85.2)	5(8.2)	4(6.6)	0
Berg Balance Scale (BBS)	76	25(32.9)	13(17.1)	20(26.3)	18(23.7)
BESTest	62	56(90.3)	5(8.1)	1(1.6)	0
MiniBESTest	59	51(86.4)	2(3.4)	3(5.1)	3(5.1)
Bow and Lean Test	54	49(90.7)	3(5.6)	1(1.9)	1(1.9)
Box and Blocks Test	54	52(96.3)	1(1.9)	0	1(1.9)
Brief Fatigue Index/Inventory	54	52(96.3)	2(3.7)	0	0
Brunel Balance Assessment	53	52(98.1)	1(1.9)	0	0
Canadian Occupational Performance Measure	52	50(96.2)	2(3.8)	0	0
Capabilities of UE Functioning Instrument (CUE)	52	51(98.1)	1(1.9)	0	0
Chedoke Arm Hand Inventory	53	51(96.2)	2(3.8)	0	0
Clinical Test of Sensory Interaction and Balance (CTSIB)	56	45(80.4)	7(12.5)	3(5.4)	1(1.8)
Modified CTSIB	53	37(69.8)	6(11.3)	6(11.3)	4(7.5)
Coma Recovery Scale –Revised	54	47(87.0)	4(7.4)	2(3.7)	1(1.9)
Community Balance and Mobility Scale	52	48(92.3)	3(5.8)	1(1.9)	0
Community Integration Questionnaire	52	49(94.2)	3(5.8)	0	0
Continuous Scale of Physical Functional Performance (CS-PFP)	49	48(98.0)	1(2.0)	0	0

Table 58. Clinical Instructor Use of Neurological Standardized Tests and Measures (continued)

Craig Handicap Assessment and Reporting Technique (CHART)	49	48(98.0)	1(2.0)	0	0
Craig Hospital Inventory of Environmental Factors (CHIEF)	50	49(98.0)	1(2.0)	0	0
Disability Rating Scale	55	50(90.9)	2(3.6)	2(3.6)	1(1.8)
Disease Steps	49	48(98.0)	1(2.0)	0	0
Disorders of Consciousness Scale	53	49(92.5)	3(5.7)	0	1(1.9)
Dix Hallpike Test	67	19(28.4)	15(22.4)	22(32.8)	11(16.4)
Dizziness Handicap Inventory (DHI)	57	34(59.6)	9(15.8)	5(8.8)	9(15.8)
Dynamic Gait Index (DGI)	67	28(41.8)	13(19.4)	11(16.4)	15(22.4)
Dynamic Visual Acuity	56	39(69.6)	8(14.3)	5(8.9)	4(7.1)
European Quality of Life Questionnaire (EuroQoL)	51	50(98.0)	1(2.0)	0	0
Expanded Disability Status Scale (EDSS)	48	47(97.9)	1(2.1)	0	0
Fatigue Descriptive Scale	51	50(98.0)	1(2.0)	0	0
Fatigue Scale for Motor and Cognitive Functions	51	50(98.0)	1(2.0)	0	0
Five Times Sit to Stand (FTSTS)	67	25(37.3)	12(17.9)	16*(23.9)	14(20.9)
Four-Square Step Test (FSST)	55	41(74.5)	7(12.7)	5*(9.1)	2(3.6)
Freezing of Gait Questionnaire	51	49(96.1)	2(3.9)	0	0
Fugl-Meyer Assessment of Motor Performance	56	53(94.6)	3(5.4)	0	0
Fullerton Advanced Balance Scale (FAB)	53	52(98.1)	1(1.9)	0	0
Function in Sitting Test	56	46(82.1)	3(5.4)	2(3.6)	5(8.9)
Functional Ambulation Categories	54	50(92.6)	2(3.7)	0	2(3.7)
Functional Assessment Measure	53	50(94.3)	3(5.7)	0	0
Functional Axial Rotation	53	51(96.2)	2(3.8)	0	0
Functional Gait Assessment (FGA)	53	40(75.5)	3(5.7)	4(7.5)	6(11.3)
Functional Independence Measure (FIM)	62	38(61.3)	6(9.7)	8(12.9)	10(16.1)
Functional Reach Test	66	27(40.9)	16(24.2)	14(21.2)	9(13.6)
Functional Status Examination	53	51(96.2)	2(3.8)	0	0
Glasgow Coma Scale	62	54(87.1)	6(9.7)	2(3.2)	0
Goal Attainment Scale	52	48(92.3)	2(3.8)	1(1.9)	1(1.9)
Graded Redefined Assessment of Strength, Sensibility, and Prehension (GRASSP)	51	50(98.0)	1(2.0)	0	0
Guy's Neurological Disability Scale	50	49(98.0)	1(2.0)	0	0
Hauser Ambulation Index	51	50(98.0)	1(2.0)	0	0

Table 58. Clinical Instructor Use of Neurological Standardized Tests and Measures (continued)

Head Impulse Test	51	43(84.3)	2(3.9)	4(7.8)	2(3.9)
Head Shake Sensory Organization (HS-SOT)	52	41(78.8)	7(13.5)	3(5.8)	1(1.9)
High-Level Mobility Assessment (HIMAT)	51	47(92.2)	1(2.0)	3(5.9)	0
Impact on Participation and Autonomy Questionnaire	51	50(98.0)	1(2.0)	0	0
International Standards for Neurological Classification of Spinal Cord Injury (ASIA)	56	48(85.7)	4(7.1)	3(5.4)	1(1.8)
Jebsen Taylor Arm Function tTest	50	49(98.0)	1(2.0)	0	0
Life Satisfaction Questionnaire (LiSat-9)	52	51(98.1)	1(1.9)	0	0
Mayo Portland adaptability iInventory-4	52	50(96.2)	1(1.9)	0	1(1.9)
Medical Outcomes Study Short Form-36 (SF-36)	52	47(90.4)	3(5.8)	2(3.8)	0
Modified Ashworth Scale	55	36(65.5)	10(18.2)	3(5.5)	6(10.9)
Modified Fatigue Impact Scale	51	47(92.2)	4(7.8)	0	0
Modified Hoehn and Yahr Staging Scale	50	47(94.0)	2(4.0)	0	1(2.0)
Montreal Cognitive Assessment	52	48(92.3)	3(5.8)	1(1.9)	0
Moss Attention Rating Scale	50	48(96.0)	1(2.0)	1(2.0)	0
Motor Activity Log (MAL)	50	49(98.0)	1(2.0)	0	0
Motricity Index	50	49(98.0)	1(2.0)	0	0
Multidimensional Pain Inventory - SCI Version	50	49(98.0)	1(2.0)	0	0
Multiple Sclerosis Functional Composite	50	49(98.0)	1(2.0)	0	0
Multiple Sclerosis Impact Scale (MSIS-29)	51	50(98.0)	1(2.0)	0	0
Multiple Sclerosis International Quality of Life Questionnaire (MusiQoL)	50	49(98.0)	1(2.0)	0	0
Multiple Sclerosis Quality of Life (MSQOL-54)	51	49(96.1)	2(3.9)	0	0
Multiple Sclerosis Quality of Life Inventory	50	48(96.0)	2(4.0)	0	0
Needs Assessment Checklist (NAC)	49	48(98.0)	1(2.0)	0	0
Neurological Outcome Scale for Traumatic Brain Injury	50	49(98.0)	1(2.0)	0	0
NIH Stroke Scale	55	46(83.6)	3(5.5)	5(9.1)	1(1.8)
Nottingham Assessment of Somatosensation	49	47(95.9)	1(2.0)	0	1(2.0)
Numeric Pain Rating Scale	58	30(51.7)	2(3.4)	1(1.7)	25(43.1)
Orpington Prognostic Scale	51	50(98.0)	1(2.0)	0	0
Parkinson's disease quality of life scale -8 item (PDQ-8)	51	48(94.1)	3(5.9)	0	0

Table 58. Clinical Instructor Use of Neurological Standardized Tests and Measures (continued)

Parkinson's Disease Quality of Life Scale – 39 Item (PDQ-39)	51	49(96.1)	2(3.9)	0	0
Parkinson's Fatigue Scale	51	49(96.1)	2(3.9)	0	0
Participation Assessment with Recombined Tools	50	48(96.0)	1(2.0)	1(2.0)	0
Patient Health Questionnaire	54	46(85.2)	2(3.7)	1(1.9)	5(9.3)
Profile PD	48	47(97.9)	1(2.1)	0	0
Postural Assessment Scale for Stroke Patients (PASS)	50	45(90.0)	3(6.0)	2(4.0)	0
Quality of Life after Brain Injury	51	50(98.0)	1(2.0)	0	0
Rancho Levels of Cognitive Functioning	54	44(81.5)	6(11.1)	3(5.6)	1(1.9)
Reintegration to Normal Living (RNL)	49	48(98.0)	1(2.0)	0	0
Rivermead Mobility Index (RMI)	50	48(96.0)	2(4.0)	0	0
Roll Test for Benign Paroxysmal Positional Vertigo	53	30(56.6)	13(24.5)	3(5.7)	7(13.2)
Romberg Test	67	20(29.9)	12(17.9)	21(31.3)	14(20.9)
Sharpened Romberg Test	61	25(41.0)	8(13.1)	19*(31.1)	9*(14.8)
Satisfaction with Life Scale (SWLS)	50	49(98.0)	1(2.0)	0	0
Semmes Weinstein Monofilaments	53	43(81.1)	4(7.5)	6(11.3)	0
Sensory Organization Test (SOT)	51	46(90.2)	3(5.9)	1(2.0)	1(2.0)
Sickness Impact Profile 68 (SIP-68)	50	49(98.0)	1(2.0)	0	0
Spinal Cord Independence Measure	49	47(95.9)	1(2.0)	0	1(2.0)
Spinal Cord Injury Functional Ambulation Inventory (SCI-FAI)	48	47(97.9)	1(2.1)	0	0
Spinal Cord Injury Functional Ambulation Profile (SCI-FAP)	47	46(97.9)	1(2.1)	0	0
Stroke Impact Scale (SIS)	52	48(92.3)	4(7.7)	0	0
Stroke Rehabilitation Assessment of Movement (STREAM)	49	46(93.9)	1(2.0)	0	2(4.1)
Stroke-Specific Quality of Life Scale	48	47(97.9)	1(2.1)	0	0
Sydney Psychosocial Reintegration Scale	46	45(97.8)	1(2.2)	0	0
Tardeieu Spasticity Scale	49	45(91.8)	3(6.1)	0	1(2.0)
Timed Up and Go (TUG)	72	8(11.1)	8(11.1)	23(31.9)	33(45.8)
Timed 25-Foot Walk Test	50	45(90.0)	2(4.0)	1(2.0)	2(4.0)
Tinetti Mobility Test	62	26(41.9)	13(21.0)	13(21.0)	10(16.1)
Trunk Control Test	48	45(93.8)	1(2.1)	1(2.1)	1(2.1)

Table 58. Clinical Instructor Use of Neurological Standardized Tests and Measures (continued)

Trunk Impairment Scale	48	43(89.6)	3(6.3)	1(2.1)	1(2.1)
Unified Parkinson's Disease Rating Scale (UPDRS)	47	46(97.9)	1(2.1)	0	0
Unipedal Stance Test (UST)	46	44(95.7)	1(2.2)	0	1(2.2)
Valsalva Test	50	44(88.0)	4(8.0)	2(4.0)	0
Visual Analog Scale (VAS)	55	25(45.5)	3(5.5)	3(5.5)	24(43.6)
VO2 Max	52	43(82.7)	5(9.6)	3(5.8)	1(1.9)
Walking and Remembering Test	48	44(91.7)	4(8.3)	0	0
Walking While Talking Test	49	43(87.8)	6(12.2)	0	0
Walking Index for Spinal Cord Injury (WISCI)	48	45(93.8)	3(6.3)	0	0
Wheelchair Skills Test	49	45(91.8)	2(4.1)	1(2.0)	1(2.0)
Wolf Motor Function Test	48	47(97.9)	1(2.1)	0	0
World Health Organization Quality of Life (WHOQOL)	50	48(96.0)	1(2.0)	1(2.0)	0
World Health Organization Quality of Life-Abbreviated Version (WHOQOL-BREF)	49	47(95.9)	1(2.0)	1(2.0)	0

Total= total number of respondents. N=number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 59. Physical Therapist Student Knowledge/use of Neurological Standardized Tests and Measures

	Total	N(%) Learned during prior academic coursework	N(%) Learned during a clinical experience	N(%) Used for a clinical experience for tis population/ setting
2-Minute Walk Test (2MWT)	69	65(94.2)	6(8.7)	15(21.7)
6-Minute Walk Test (6MWT)	100	95(95.0)	15(15.0)	33(33.0)
9-Hole Peg Test	58	53(91.4)	7(12.1)	4(6.9)
10-Meter Walk Test (10MWT)	77	70(90.9)	10(13.0)	15(19.5)
12-Item Multiple Sclerosis Walking Scale (MSWS-12)	12	11(91.7)	2(16.7)	0
360 Degree Turn Stand	37	34(91.9)	5(13.5)	13(35.1)
Activity-Specific Balance Confidence Scale (ABC)	49	46(93.9)	13(26.5)	12(24.5)

Table 59. Physical Therapist Student Knowledge/use of Neurological Standardized Tests and Measures (continued)

Action Reaction Arm Test (ARAT)	33	32(97.0)	1(3.0)	2(6.1)
Agitated Behavior Scale	30	27(90.0)	3(10.0)	2(6.7)
Balance Error Scoring System (BESS)	35	33(94.3)	1(2.9)	4(11.4)
Barthel Index	53	50(94.3)	5(9.4)	4(7.6)
Berg Balance Scale (BBS)	101	96(95.1)	18(17.8)	43(42.6)
BESTest	64	62(96.9)	4(6.3)	3(4.7)
MiniBESTest	71	67(94.4)	7(9.9)	6(8.5)
Bow and Lean Test	7	4(57.1)	3(42.9)	1(14.3)
Box and Blocks Test	22	22(100.0)	0	1(4.6)
Brief Fatigue Index/Inventory	5	5(100.0)	0	0
Brunel Balance Assessment	12	10(83.3)	2(16.7)	0
Canadian Occupational Performance Measure	8	8(100.00)	0	0
Capabilities of UE Functioning Instrument (CUE)	2	2(100.0)	0	0
Chedoke Arm Hand Inventory	9	8(88.9)	1(11.1)	0
Clinical Test of Sensory Interaction and Balance (CTSIB)	40	39(97.5)	5(12.5)	5(12.5)
Modified CTSIB	56	50(89.3)	10(17.9)	15(26.8)
Coma Recovery Scale –Revised	37	33(89.2)	4(10.8)	4(10.8)
Community Balance and Mobility Scale	29	27(93.1)	2(6.9)	1(3.5)
Community Integration Questionnaire	13	13(100.0)	0	0
Continuous Scale of Physical Functional Performance (CS-PFP)	5	5(100.0)	0	0
Craig Handicap Assessment and Reporting Technique (CHART)	7	6(85.7)	1(14.3)	0
Craig Hospital Inventory of Environmental Factors (CHIEF)	5	5(100.0)	1(20.0)	0
Disability Rating Scale	30	29(96.7)	1(3.3)	1(3.3)
Disease Steps	2	2(100.0)	0	0
Disorders of Consciousness Scale	11	11(100.0)	0	0
Dix Hallpike Test	94	90(95.7)	30(31.9)	37(39.4)
Dizziness Handicap Inventory (DHI)	48	43(89.6)	11(22.9)	16(33.3)
Dynamic Gait Index (DGI)	94	88(93.6)	20(21.3)	36(38.3)
Dynamic Visual Acuity	54	52(96.3)	6(11.1)	11(20.4)
European Quality of Life Questionnaire (EuroQoL)	5	5(100.0)	0	0
Expanded Disability Status Scale (EDSS)	9	8(88.9)	1(11.1)	0

Table 59. Physical Therapist Student Knowledge/use of Neurological Standardized Tests and Measures (continued)

Fatigue Descriptive Scale	6	6(100.0)	1(16.7)	0
Fatigue Scale for Motor and Cognitive Functions	6	6(100.0)	0	0
Five Times Sit to Stand (FTSTS)	79	72(91.1)	21(26.6)	33(41.8)
Four-Square Step Test (FSST)	54	48(88.9)	10(18.5)	11(20.4)
Freezing of Gait Questionnaire	25	25(100.0)	2(8.0)	1(4.0)
Fugl-Meyer Assessment of Motor Performance	73	69(94.5)	6(8.2)	4(5.5)
Fullerton Advanced Balance Scale (FAB)	17	16(94.1)	2(11.8)	2(11.8)
Function in Sitting Test	37	35(94.6)	3(8.1)	3(8.1)
Functional Ambulation Categories	7	7(100.0)	0	0
Functional Assessment Measure	19	17(89.5)	1(5.3)	1(5.3)
Functional Axial Rotation	4	3(75.0)	0	1(25.0)
Functional Gait Assessment (FGA)	64	62(96.9)	9(14.1)	18(28.1)
Functional Independence Measure (FIM)	82	75(91.5)	17(20.7)	22(26.8)
Functional Reach Test	79	77(97.5)	13(16.5)	28(35.4)
Functional Status Examination	5	5(100.0)	0	0
Glasgow Coma Scale	88	87(98.9)	5(5.7)	7(8.0)
Goal Attainment Scale	11	10(90.9)	1(9.1)	0
Graded Redefined Assessment of Strength, Sensibility, and Prehension (GRASSP)	5	5(100.0)	0	0
Guy's Neurological Disability Scale	3	3(100.0)	0	0
Hauser Ambulation Index	2	2(100.0)	0	0
Head Impulse Test	26	24(92.3)	4(15.4)	3(11.5)
Head Shake Sensory Organization (HS-SOT)	27	22(81.5)	6(22.2)	5(18.5)
High-Level Mobility Assessment (HIMAT)	34	32(94.1)	3(8.8)	2(5.9)
Impact on Participation and Autonomy Questionnaire	4	4(100.0)	0	0
International Standards for Neurological Classification of Spinal Cord Injury (ASIA)	37	36(97.3)	1(2.7)	4(10.8)
Jebsen Taylor Arm Function tTest	12	12(100.0)	0	1(8.3)
Life Satisfaction Questionnaire (LiSat-9)	9	9(100.0)	0	0
Mayo Portland adaptability iInventory-4	2	2(100.0)	0	0
Medical Outcomes Study Short Form-36 (SF-36)	34	34(100.0)	0	2(5.9)
Modified Ashworth Scale	89	87(97.8)	8(9.0)	23(25.8)
Modified Fatigue Impact Scale	20	19(95.0)	1(5.0)	0
Modified Hoehn and Yahr Staging Scale	28	27(96.4)	1(3.6)	0

Table 59. Physical Therapist Student Knowledge/use of Neurological Standardized Tests and Measures (continued)

Montreal Cognitive Assessment	25	24(96.0)	1(4.0)	2(8.0)
Moss Attention Rating Scale	11	11(100.0)	0	0
Motor Activity Log (MAL)	17	16(94.1)	1(5.9)	0
Motricity Index	5	5(100.0)	0	0
Multidimensional Pain Inventory - SCI Version	4	4(100.0)	0	0
Multiple Sclerosis Functional Composite	8	8(100.0)	1(12.5)	`(12.5)
Multiple Sclerosis Impact Scale (MSIS-29)	17	15(88.2)	2(11.8)	1(5.9)
Multiple Sclerosis International Quality of Life Questionnaire (MusiQoL)	9	8(88.9)	1(11.1)	0
Multiple Sclerosis Quality of Life (MSQOL-54)	17	16(94.1)	1(5.9)	1(5.9)
Multiple Sclerosis Quality of Life Inventory	6	6(100.0)	0	0
Needs Assessment Checklist (NAC)	3	3(100.0)	0	0
Neurological Outcome Scale for Traumatic Brain Injury	11	10(90.9)	1(9.1)	0
NIH Stroke Scale	46	40(87.0)	9(19.6)	9(19.6)
Nottingham Assessment of Somatosensation	7	7(100.0)	0	0
Numeric Pain Rating Scale	56	56(91.8)	13(21.3)	39(63.9)
Orpington Prognostic Scale	8	8(100.0)	1(12.5)	1(12.5)
Parkinson's disease quality of life scale -8 item (PDQ-8)	31	30(96.8)	3(9.7)	1(3.2)
Parkinson's Disease Quality of Life Scale – 39 Item (PDQ-39)	32	31(96.9)	3(9.4)	1(3.1)
Parkinson's Fatigue Scale	19	18(94.7)	2(10.5)	0
Participation Assessment with Recombined Tools	2	2(100.0)	0	0
Patient Health Questionnaire	14	12(85.7)	1(7.4)	4(25.6)
Profile PD	2	2(100.0)	0	0
Postural Assessment Scale for Stroke Patients (PASS)	18	17(94.4)	3(16.7)	4(22.2)
Quality of Life after Brain Injury	7	7(100.0)	0	0
Rancho Levels of Cognitive Functioning	70	69(98.6)	3(4.3)	2(2.9)
Reintegration to Normal Living (RNL)	4	3(75.0)	1(25.0)	0
Rivermead Mobility Index (RMI)	9	9(100.0)	0	0
Roll Test for Benign Paroxysmal Positional Vertigo	43	40(93.0)	10(23.3)	12(27.9)
Romberg Test	93	87(93.6)	22(23.7)	41(44.1)
Sharpened Romberg Test	62	58(93.6)	15(24.2)	33(53.2)

Table 59. Physical Therapist Student Knowledge/use of Neurological Standardized Tests and Measures (continued)

Satisfaction with Life Scale (SWLS)	6	6(100.0)	0	0
Semmes Weinstein Monofilaments	42	40(95.2)	3(7.1)	4(9.5)
Sensory Organization Test (SOT)	34	30(88.2)	5(14.7)	5(14.7)
Sickness Impact Profile 68 (SIP-68)	5	4(80.0)	1(20.0)	0
Spinal Cord Independence Measure	18	18(100.0)	0	0
Spinal Cord Injury Functional Ambulation Inventory (SCI-FAI)	11	11(100.0)	1(9.1)	0
Spinal Cord Injury Functional Ambulation Profile (SCI-FAP)	9	9(100.0)	1(11.1)	0
Stroke Impact Scale (SIS)	42	40(95.2)	5(11.9)	4(9.5)
Stroke Rehabilitation Assessment of Movement (STREAM)	14	12(85.7)	2(14.3)	0
Stroke-Specific Quality of Life Scale	12	10(83.3)	2(16.7)	0
Sydney Psychosocial Reintegration Scale	2	2(100.0)	0	0
Tardeieu Spasticity Scale	24	24(100.0)	1(4.2)	2(8.3)
Timed Up and Go (TUG)	94	88(93.6)	24(25.5)	48(51.1)
Timed 25-Foot Walk Test	17	17(100.0)	2(11.8)	1(5.9)
Tinetti Mobility Test	74	73(98.7)	15(20/3)	25(33.8)
Trunk Control Test	15	14(93.3)	0	1(6.7)
Trunk Impairment Scale	8	8(100.0)	0	0
Unified Parkinson's Disease Rating Scale (UPDRS)	23	23(100.0)	2(8.7)	1(4.4)
Unipedal Stance Test (UST)	3	3(100.0)	0	0
Valsalva Test	32	31(96.9)	1(3.1)	2(6.3)
Visual Analog Scale (VAS)	72	70(97.2)	21(29.2)	37(51.4)
VO2 Max	64	63(98.4)	1(1.6)	3(4.7)
Walking and Remembering Test	21	19(90.5)	4(19.1)	2(9.5)
Walking While Talking Test	37	34(91.9)	7(18.9)	7(18.9)
Walking Index for Spinal Cord Injury (WISCI)	9	9(100.0)	1(11.1)	0
Wheelchair Skills Test	26	25(96.2)	2(7.7)	2(7.7)
Wolf Motor Function Test	29	28(96.6)	1(3.5)	0
World Health Organization Quality of Life (WHOQOL)	30	29(96.7)	2(6.7)	0
World Health Organization Quality of Life-Abbreviated Version (WHOQOL-BREF)	21	20(95.2)	2(9.5)	0

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item

Table 60. Clinical Instructor Use of Standardized Tests and Measures in Oncology

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
2-Minute Walk Test (2MWT)	29	5(78.4)	5(13.5)	1(2.7)	2(5.4)
12-Minute Walk Test	32	30(93.8)	1(3.1)	0	1(3.1)
10-Meter Walk Test (10MWT)	38	25(65.8)	4(10.5)	3*(7.9)	6(15.8)
Five Times Sit to Stand (FTSTS)	38	18(47.4)	7(18.4)	6(15.8)	7(18.4)
6-Minute Walk Test (6MWT)	40	20(50.0)	9(22.5)	2(5.0)	9(22.5)
Activity Measure for Post-Acute Care (AMPAC)	30	29(96.7)	1(3.3)	0	0
Assessment of Life Habits	30	28(93.3)	2(6.7)	0	0
Barthel Index	31	28(90.3)	2(6.5)	1(3.2)	0
Berg Balance Score (BBS)	39	17(43.6)	10(25.6)	3(7.7)	9(23.1)
Brief Fatigue Inventory	28	26(92.9)	1(3.6)	1(3.6)	0
Brief Pain Inventory	28	26(92.9)	1(3.6)	1(3.6)	0
Brief Peripheral Neuropathy Screen	28	26(92.9)	1(3.6)	1(3.6)	0
Borg Rating Scale of Perceived Exertion	35	20(57.1)	5(14.3)	4(11.4)	6(17.1)
Bruininks-Oseretsky Test of Motor Proficiency	28	24(85.7)	2(7.1)	0	2(7.1)
Dizziness Handicap Inventory Scale	31	19(61.3)	4(12.9)	2(6.5)	6(19.4)
Disabilities of the Arms, Shoulders, and Hand (DASH)	37	22(59.5)	4(10.8)	3(8.1)	8(21.6)
Face Pain Scale –Revised	33	21(63.6)	4(12.1)	5(15.2)	3(9.1)
Functional Assessment of Cancer Therapy-Cognitive Function	28	27(96.4)	1(3.6)	0	0
Functional Independence Measure (FIM)	34	22(64.7)	5(14.7)	2(5.9)	5(14.7)
Functional Reach	33	19(57.6)	6(18.2)	5(15.2)	3(9.1)
General Sickness Impact Profile	27	26(96.3)	1(3.7)	0	0
High Level Mobility Assessment Tool	27	26(96.3)	1(3.7)	0	0
Karnofsky Performance Scale	27	24(88.9)	2(7.4)	0	1(3.7)
Medical Research Council Dyspnea Scale	28	26(92.9)	1(3.6)	0	1(3.6)
Mini-Mental State Examination	31	27(87.1)	2(6.5)	1(3.2)	1(3.2)
Modified Total Neuropathy Score	27	25(92.6)	1(3.7)	1(3.7)	0
National Cancer Institute's Common Terminology Criteria for Adverse Events, Version 4.0	27	26(96.3)	1(3.7)	0	0
Neuropathy Screening Scale	27	25(92.6)	2(7.4)	0	0
Numeric Rating Scale	31	19(61.3)	1(3.2)	3(9.7)	8(25.8)

Table 60. Clinical Instructor Use of Standardized Tests and Measures in Oncology (continued)

Peabody Developmental Motor Scale	29	24(82.8)	2(6.9)	1(3.4)	2(6.9)
Perceived Cognition Questionnaire	27	26(96.3)	1(3.7)	0	0
Physical Battery for Patients with Cancer	27	26(96.3)	1(3.7)	0	0
Physical Performance Test	27	23(85.2)	2(7.4)	1(3.7)	1(3.7)
Piper Fatigue Scale	27	26(96.3)	1(3.7)	0	0
Shoulder Pain and Disability Index (SPADI)	30	27(90.0)	1(3.3)	0	2*(3.3)
Timed Up and Go (TUG)	38	9(23.7)	6(15.8)	12(31.6)	11(28.9)
Tinetti Balance and Gait Scale	36	17(47.2)	6(16.7)	8(22.2)	5(13.9)
Reintegration to Normal Living Index	28	27(96.4)	1(3.6)	0	0
Short Performance Physical Battery	28	27(96.4)	1(3.6)	0	0
Visual Analog Scale	35	16(45.7)	1(2.9)	7(20.0)	11(31.4)

Total= total number of respondents. N=number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 61. Physical Therapist Student Knowledge/use of Standardized Tests and Measures in Oncology

	Total	Learned during prior academic coursework	Learned during a clinical experience	Used during a clinical experience for this population/ setting
2-Minute Walk Test (2MWT)	53	52(98.1)	3(5.7)	4(7.6)
12-Minute Walk Test	36	35(97.2)	1(2.8)	2(5.6)
10-Meter Walk Test (10MWT)	59	56(94.9)	6(10.2)	5(8.5)
Five Times Sit to Stand (FTSTS)	65	59(90.8)	12(18.5)	13(20.0)
6-Minute Walk Test (6MWT)	74	71(96.0)	7(9.5)	11(14.9)
Activity Measure for Post-Acute Care (AMPAC)	6	5(83.3)	2(33.3)	1(16.7)
Assessment of Life Habits	4	4(100.0)	0	0
Barthel Index	42	42(100.0)	2(4.8)	4(9.5)
Berg Balance Score (BBS)	76	74(97.4)	10(13.2)	14(18.4)
Brief Fatigue Inventory	11	10(90.9)	1(9.1)	1(9.1)
Brief Pain Inventory	8	8(100.0)	0	0
Brief Peripheral Neuropathy Screen	7	7(100.0)	0	0
Borg Rating Scale of Perceived Exertion	59	57(96.6)	5(8.5)	12(20.3)
Bruininks-Oseretsky Test of Motor Proficiency	15	14(93.3)	2(13.3)	1(6.7)

Table 61. Physical Therapist Student Knowledge/use of Standardized Tests and Measures in Oncology (continued)

Dizziness Handicap Inventory Scale	37	36(97.3)	6(16.2)	3(8.1)
Disabilities of the Arms, Shoulders, and Hand (DASH)	62	59(95.2)	11(17.7)	7(11.3)
Face Pain Scale –Revised	30	28(93.3)	2(6.7)	5(16.7)
Functional Assessment of Cancer Therapy-Cognitive Function	3	3(100.0)	0	0
Functional Independence Measure (FIM)	59	55(93.2)	9(15.3)	5(8.5)
Functional Reach	58	58(100.0)	6(10.3)	4(6.9)
General Sickness Impact Profile	2	2(100.0)	0	0
High Level Mobility Assessment Tool	18	17(94.4)	2(11.1)	0
Karnofsky Performance Scale	5	5(100.0)	1(20.0)	1(20.0)
Medical Research Council Dyspnea Scale	5	5(100.0)	0	0
Mini-Mental State Examination	54	52(96.3)	4(7.4)	0
Modified Total Neuropathy Score	3	3(100.0)	0	0
National Cancer Institute's Common Terminology Criteria for Adverse Events, Version 4.0	2	2(100.0)	0	0
Neuropathy Screening Scale	5	5(100.0)	0	0
Numeric Rating Scale	48	48(100.0)	6(12.5)	12(25.0)
Peabody Developmental Motor Scale	58	58(100.0)	5(8.6)	6(10.3)
Perceived Cognition Questionnaire	12	12(100.0)	0	0
Physical Battery for Patients with Cancer	2	2(100.0)	0	0
Physical Performance Test	8	8(100.0)	0	0
Piper Fatigue Scale	2	2(100.0)	0	0
Shoulder Pain and Disability Index (SPADI)	37	35(94.6)	3(8.1)	5(13.5)
Timed Up and Go (TUG)	72	71(98.6)	14(19.44)	15(20.8)
Tinetti Balance and Gait Scale	66	65(98.5)	9(13.6)	9(13.6)
Reintegration to Normal Living Index	3	3(100.0)	0	0
Short Performance Physical Battery	9	8(88.9)	1(11.1)	0
Visual Analog Scale	58	57(98.3)	14(24.1)	13(22.4)

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 62. Clinical Instructor Use of Pediatric Standardized Tests and Measures

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
10-Meter Walk Test (10MWT)	37	28(75.7)	2(5.4)	4(10.8)	3(8.1)
Alberta Infant Motor Scale (AIMS)	34	25(73.5)	6(17.6)	1(2.9)	2(5.9)
Balance Error Scoring System (BESS)	32	28(87.5)	3(9.4)	1(3.1)	0
Bayley Scale of Infant and Toddler Development-III	34	29(85.3)	4(11.8)	1(2.9)	0
Bruinicks-Oseretsky Test of Motor Proficiency (BOT)	34	20(58.8)	4(11.8)	2(5.9)	8(23.5)
Canadian Occupational Performance Measure (COPM)	32	29(90.6)	3(9.4)	0	0
Functional Mobility Scale	33	21(63.6)	9(27.3)	3(9.1)	0
Gross Motor Functional Scale (GMFM)	36	19(52.8)	7(19.4)	6(16.7)	4(11.1)
Medical Outcomes Study Short Form-36 (SF-36)	31	28(90.3)	2(6.5)	1(3.2)	0
Motor Growth Curves for Cerebral Palsy	32	28(87.5)	2(6.3)	1(3.1)	1(3.1)
Movement Assessment Battery for Children (ABC)	33	27(81.8)	3(9.1)	2*(6.1)	1(3.0)
Pediatric Quality of Life Inventory (PQoL)	30	27(90.0)	2(6.7)	1(3.3)	0
Pediatric Balance Scale	32	23(71.9)	5(15.6)	2(6.3)	2(6.3)
Peabody Developmental Motor Scales (PDMS-2)	35	20(57.1)	2(5.7)	3(8.6)	10(28.6)
Test of Playfulness (ToP)	31	31(100.0)	0	0	0
Test of Basic Motor Skills (BMS)	32	32(100.0)	0	0	0

Total= total number of respondents. N(%) =number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 63. Physical Therapist Student Knowledge/use of Pediatric Standardized Tests and Measures

	Total	N(%) Learned in prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population Or setting
10-Meter Walk Test (10MWT)	52	52(100.0)	3(5.8)	6(11.5)
Alberta Infant Motor Scale (AIMS)	50	47(94.0)	3(6.0)	4(8.0)
Balance Error Scoring System (BESS)	34	34(100.0)	0	0
Bayley Scale of Infant and Toddler Development-III	29	26(89.7)	3(10.3)	3(10.3)
Bruinicks-Oseretsky Test of Motor Proficiency (BOT)	64	63(98.4)	8(12.5)	15(23.4)
Canadian Occupational Performance Measure (COPM)	16	16(100.0)	0	0
Functional Mobility Scale	54	53(98.2)	1(1.9)	2(3.7)
Gross Motor Functional Scale (GMFM)	69	67(97.1)	5(7.3)	15(21.7)
Medical Outcomes Study Short Form-36 (SF-36)	48	48(100.0)	0	1(2.1)
Motor Growth Curves for Cerebral Palsy	19	19(100.0)	0	0
Movement Assessment Battery for Children (ABC)	37	37(100.0)	0	0
Pediatric Quality of Life Inventory (PQoL)	21	21(100.0)	0	0
Pediatric Balance Scale	7	7(100.0)	0	0
Peabody Developmental Motor Scales (PDMS-2)	73	72(98.6)	8(11.0)	16(21.9)
Test of Playfulness (ToP)	4	4(100.0)	0	0
Test of Basic Motor Skills (BMS)	15	13(88.7)	2(13.3)	0

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 64. Clinical Instructor Use of Standardized Tests and Measures in Women's Health

	Total	N(%) Do not use	N(%) Use rarely	N(%) Use occasionally	N(%) Use routinely
Chronic Prostatitis Symptom Index (NIH-CPSI)	24	23(95.8)	1(4.2)	0	0
Colorectal Functional Outcome Questionnaire (COREFO)	22	21(95.5)	1(4.5)	0	0
Constipation Scoring System (CSS)	22	21(95.5)	1(4.5)	0	0
Depression, Anxiety, Stress Scale (DASS21)	22	21(95.5)	1(4.5)	0	0
Fear Avoidance Beliefs Questionnaire (FABQ)	26	18(69.2)	3(11.5)	1(3.8)	4(15.4)
Female Sexual Function Index (FSFI)	23	21(91.3)	1(4.3)	1(4.3)	0
Geriatric Self Efficacy Scale for Urinary Incontinence (GSE-UI)	22	21(95.5)	1(4.5)	0	0
Incontinence Impact Questionnaire (IIQ)	23	21(91.3)	1(4.3)	1(4.3)	0
International Consultation on Incontinence Questionnaire – Bowels (ICIQ-B)	23	21(91.3)	1(4.3)	1(4.3)	0
Lower Extremity Functional Scale (LEFS)	27	13(48.1)	4(14.8)	1(3.7)	9(33.3)
Medical Outcomes Study Short Form -36 (SF-36)	23	20(87.0)	1(4.3)	0	2(8.7)
Oswestry Low Back Pain Disability Questionnaire	26	13(50.0)	3(11.5)	2(7.7)	8(30.8)
Pain Catastrophizing Scale (PCS)	24	20(83.3)	2(8.3)	0	2(8.3)
Patient Specific Functional Scale (PSFS)	24	20(83.3)	1(4.2)	1(4.2)	2(8.3)
Pelvic Floor Distress Inventory (PFDI-20)	24	19(79.2)	0	1(4.2)	4(16.7)
Pelvic Floor Impact Questionnaire (PFIQ-7)	22	20(90.9)	1(4.5)	1(4.5)	0
Pelvic Girdle Pain Questionnaire (PGQ)	22	21(95.5)	0	1(4.5)	0
Pelvic Organ Prolapse – Urinary Incontinence Sexual Function Questionnaire (PISQ-12)	22	22(100.0)	0	0	0
Short Personal Experience Questionnaire (SPEQ)	21	21(100.0)	0	0	0
Tampa Scale for Kinesiophobia (TSK)	21	21(100.0)	0	0	0
Urogenital Distress Inventory (UDI)	22	22(100)	0	0	0

Total= total number of respondents. N(%)=number of item responses (Valid Percent)
*Learned from a student (n=1 for each item)

Table 65. Physical Therapist Student Knowledge/use of Standardized Tests and Measures in Women's Health

	Total	N(%) Learned during prior academic coursework	N(%) Learned during a clinical experience	N(%) Used during a clinical experience for this population /setting
Chronic Prostatitis Symptom Index (NIH-CPSI)	3	2(66.7)	1(33.3)	0
Colorectal Functional Outcome Questionnaire (COREFO)	3	2(66.7)	0	1(33.3)
Constipation Scoring System (CSS)	4	4(100.0)	0	0
Depression, Anxiety, Stress Scale (DASS21)	17	16(94.1)	1(5.9)	2(11.8)
Fear Avoidance Beliefs Questionnaire (FABQ)	59	59(100.0)	4(6.8)	2(3.4)
Female Sexual Function Index (FSFI)	4	2(50.0)	2(50.0)	1(25.0)
Geriatric Self Efficacy Scale for Urinary Incontinence (GSE-UI)	4	3(75.0)	1(25.0)	1(25.0)
Incontinence Impact Questionnaire (IIQ)	14	11(78.6)	2(14.3)	2(14.3)
International Consultation on Incontinence Questionnaire – Bowels (ICIQ-B)	4	2(50.0)	2(50.0)	1(25.0)
Lower Extremity Functional Scale (LEFS)	60	59(98.3)	11(18.3)	5(8.3)
Medical Outcomes Study Short Form -36 (SF-36)	33	33(100.0)	2(6.1)	0
Oswestry Low Back Pain Disability Questionnaire	60	60(100.0)	8(13.3)	7(11.7)
Pain Catastrophizing Scale (PCS)	30	30(100.0)	0	1(3.3)
Patient Specific Functional Scale (PSFS)	30	30(100.0)	3(10.0)	1(3.3)
Pelvic Floor Distress Inventory (PFDI-20)	8	5(62.5)	2(25.0)	2(25.0)
Pelvic Floor Impact Questionnaire (PFIQ-7)	7	4(57.1)	2(28.6)	2(28.6)
Pelvic Girdle Pain Questionnaire (PGQ)	7	5(71.4)	1(14.3)	1(14.3)
Pelvic Organ Prolapse – Urinary Incontinence Sexual Function Questionnaire (PISQ-12)	4	4(100.0)	0	0
Short Personal Experience Questionnaire (SPEQ)	4	4(100.0)	0	0
Tampa Scale for Kinesiophobia (TSK)	9	9(100.0)	0	0
Urogenital Distress Inventory (UDI)	4	3(75.0)	1(25.0)	0

N=number of item responses (Valid Percent)
Total= total number of respondents. Respondents may have provided multiple responses per item.

Table 66. Additional Standardized Tests and Measures Reported by Practice Area/Patient Category

Practice Area Population Category	Reported by Clinical Instructors	Reported by Physical Therapist Students
Acute Care	Berg Balance Scale (BBS), Elderly Mobility Scale, Romberg Test, Confusion Assessment Method (CAM), Five Times Sit to Stand (FTSTS), 30-Second Chair Rise, Functional Reach Test, Alberta Infant Motor Scale (AIMS), Early Learning Development Profile, Timed Up and Down Stairs (TUDS), Timed Floor to Stand-Normal (TFTS-N), Thirty-Second Walk Test (30sWT), Dynamic Gait Index (DGI), Gross Motor Functional Scale (GMFM), and Gait Speed	AIMS, Bruinicks-Oseretsky Test of Motor Proficiency, Second Edition (BOT2), Peabody Developmental Motor Scales, Second Edition (PDMS-2), Oswestry Low Back Pain Disability Questionnaire, Fear Avoidance Beliefs Questionnaire (FABQ), AIMS, Dynamic Gait Index (DGI), Penn Shoulder Score, Pelvic Floor Distress Inventory (PFDI-20), BBS, 2-Minute Walk Test, 30-Second Chair Rise, Neurorecovery Scale, Community Balance and Mobility Scale, Test of Gross Motor Development, Second Edition (TGMD-2), Montreal Cognitive Assessment (MOCA), NIH Stroke Scale, Modified Ashworth scale, Richmond Agitation-Sedation Scale, Standardized Five Questions (S5Q), Confusion Assessment Method for ICU (CAM ICU), Functional Disability Inventory, Amputee Mobility Predictor Prosthesis (AMPPro), Amputee Mobility Predictor No Prosthesis (AMPnoPro), Focus on® Therapeutic Outcomes (FOTO), Lower Extremity Functional Scale (LEFS), Neck Disability Index (NDI), and Romberg Test
Cardiovascular and Pulmonary	2-Minute Walk Test	3-Minute Step Test
Geriatrics and Home Health	3-Meter Walk Test, 30-Second Sit to Stand Test, Knee Injury and Osteoarthritis Outcome Score (KOOS), and Hip Injury and Osteoarthritis Outcome Score (HOOS)	30-Second Sit to Stand Test
Orthopedic/ Musculoskeletal	Valgus test, Varus test, Phalen's test, Thomas test, Functional Y Test, Triple Hop Test, Box Hop Test, Zig Zag Triple Hop, Vertical Jump, Ober test, Prone Lumbar Stability Test, Neer's Impingement Test, Drop Arm Test, Hawkin-Kennedy Impingement Test, FOTO, Tampa Scale of Kinesiophobia, Orebro Musculoskeletal Questionnaire (OSMQ-12), Headache Impact Test (HIT-6^{TM}), Dizziness Handicap Inventory (DHI), Western Ontario & McMaster Universities Osteoarthritis Index (WOMAC)	Oswestry Low Back Pain Disability Questionnaire, Penn Shoulder Score

Table 66. Additional Standardized Tests and Measures Reported by Practice Area/Patient Category (continued)

Neurological	TUDS, TFTS-N, 30-Second Walk Test, Shuttle Run, and Modified Rankin Scale	---
Oncology	30-Second Sit to Stand	---
Pediatrics	TUDS, TFTS-N, 30-Second Walk Test, Shuttle Run, FRT, FTSTS, Face, Legs, Activity, Cry, Consolability Scale (FLACC), Wong Baker Faces Pain Scale, Pediatric Evaluation of Disability Inventory (PEDI), Hawaii Early Learning Profile (HELP), School Functional assessment (SFA)	BOT-2, Functional Disability Inventory, HELP, TGMD-2 , PEDI, SFA, Early Learning Accomplishment Profile (E-LAP)
Women's Health	Vulvar Pain Function Questionnaire	---

Figure 5. Scree Plot for Q20 Principal Component Analysis

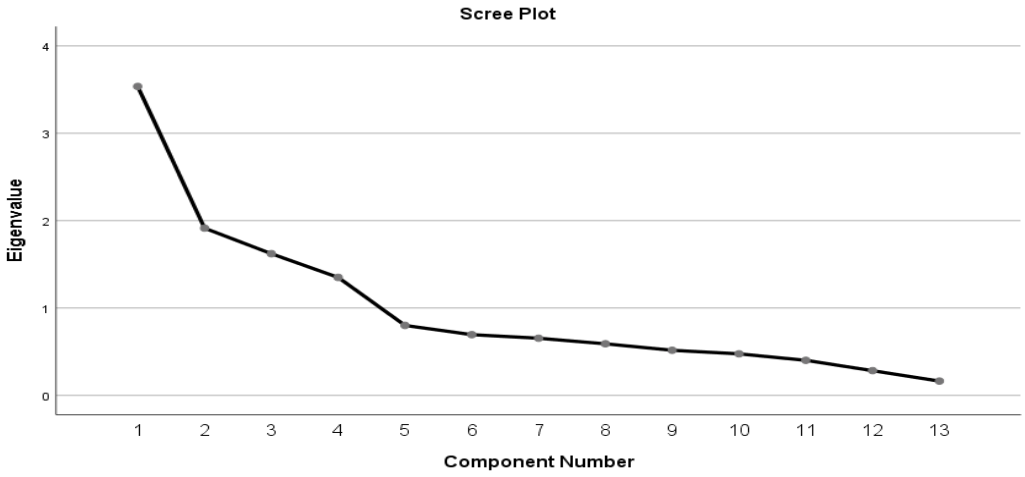


Figure 6: Normality Distribution for Question 20 Principal Component Analysis Factor One

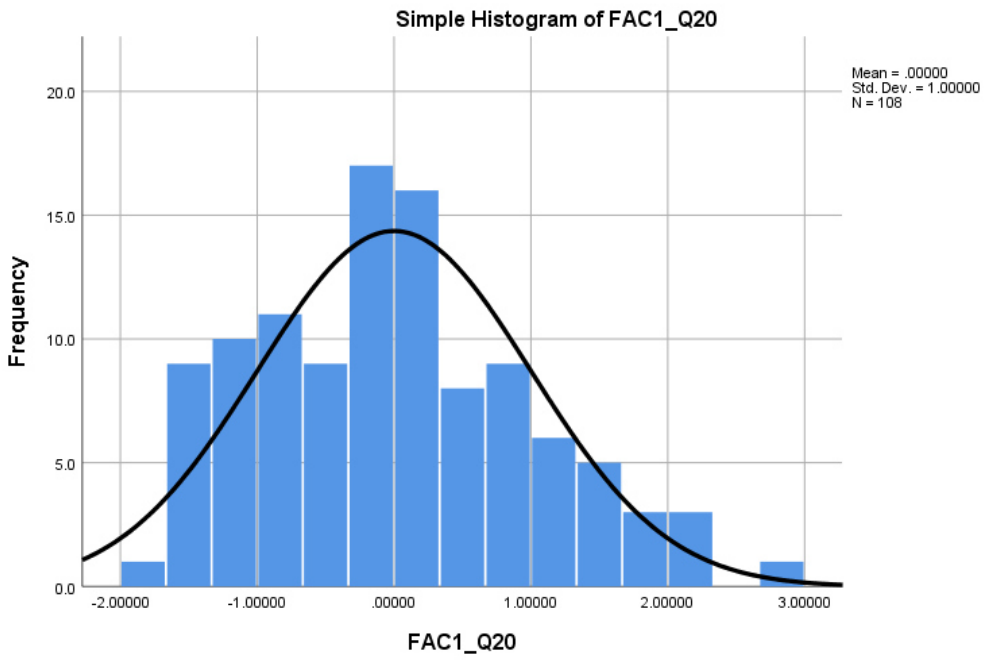


Figure 7: Normality Distribution for Question 20 Principal Component Analysis Factor Two

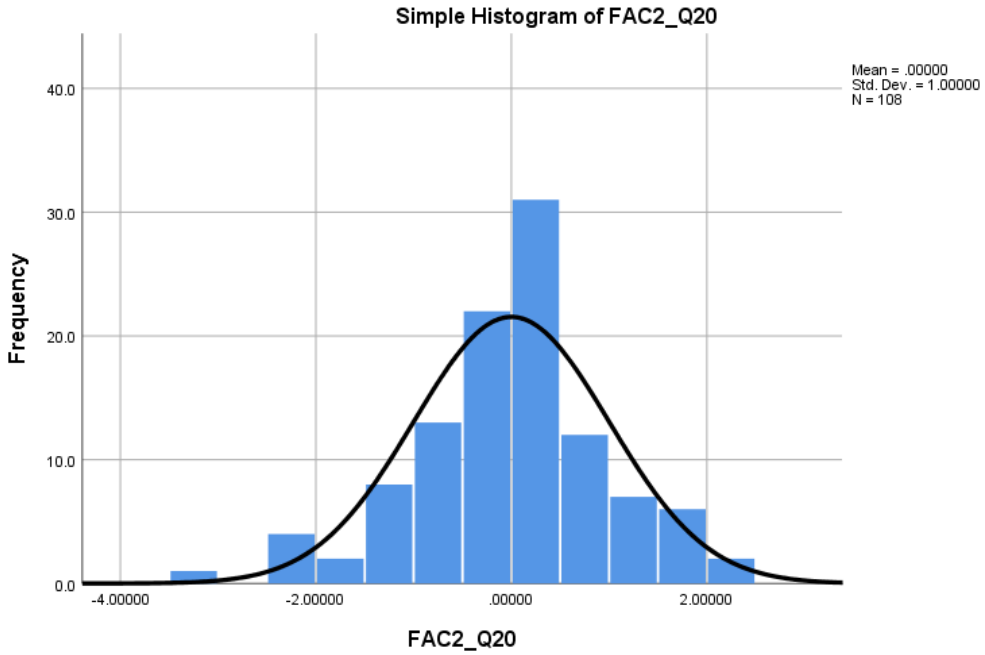


Figure 8: Normality Distribution for Question 20 Principal Component Analysis Factor Three

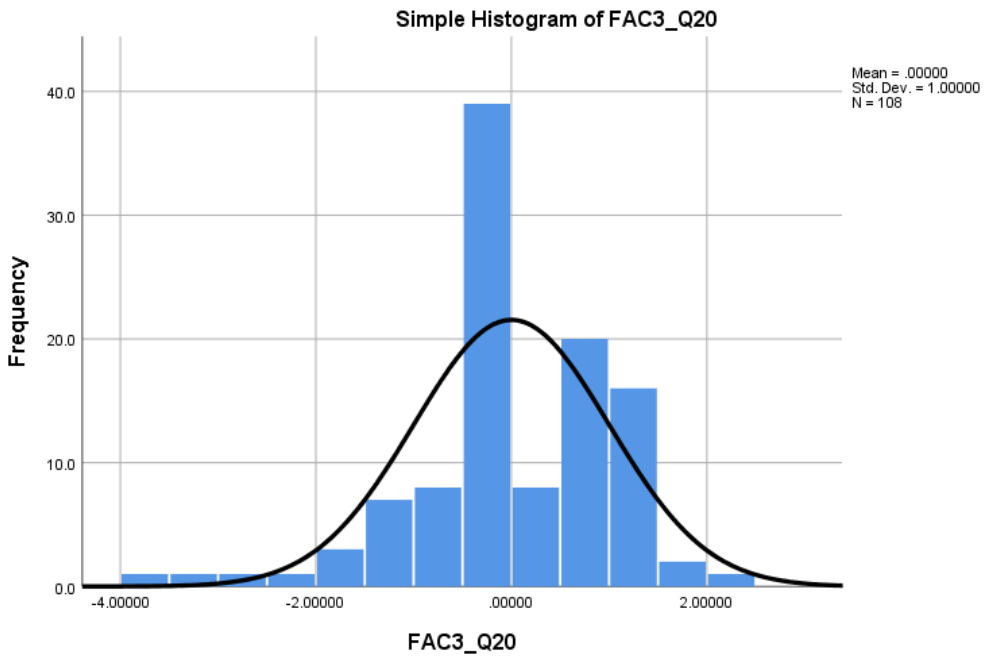


Figure 9: Normality Distribution for Question 20 Principal Component Analysis Factor Four

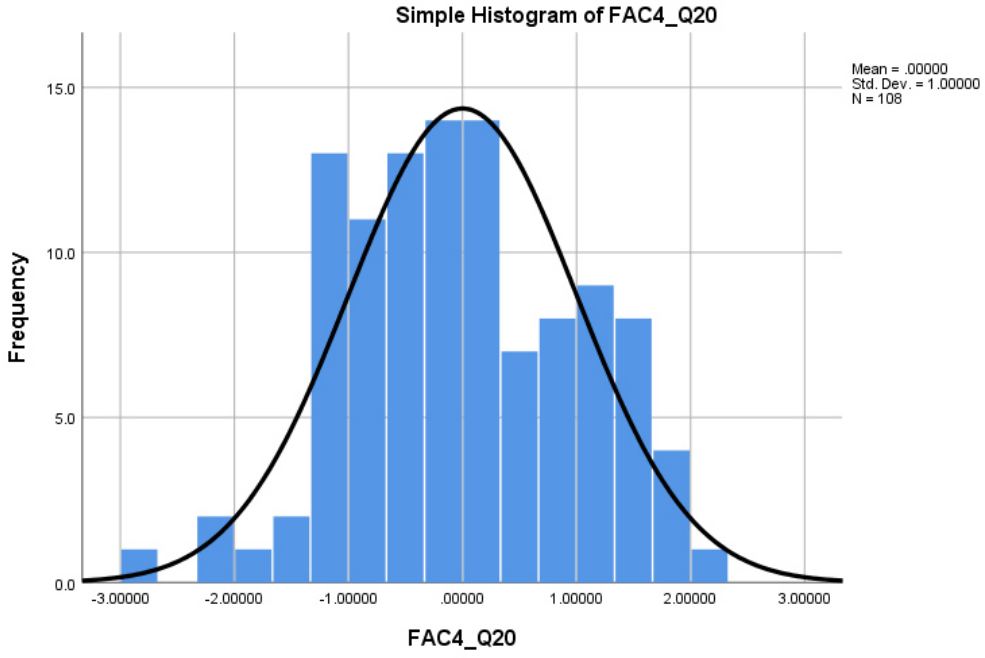


Figure 10. Scree Plot: Principal Component Analysis for Q18

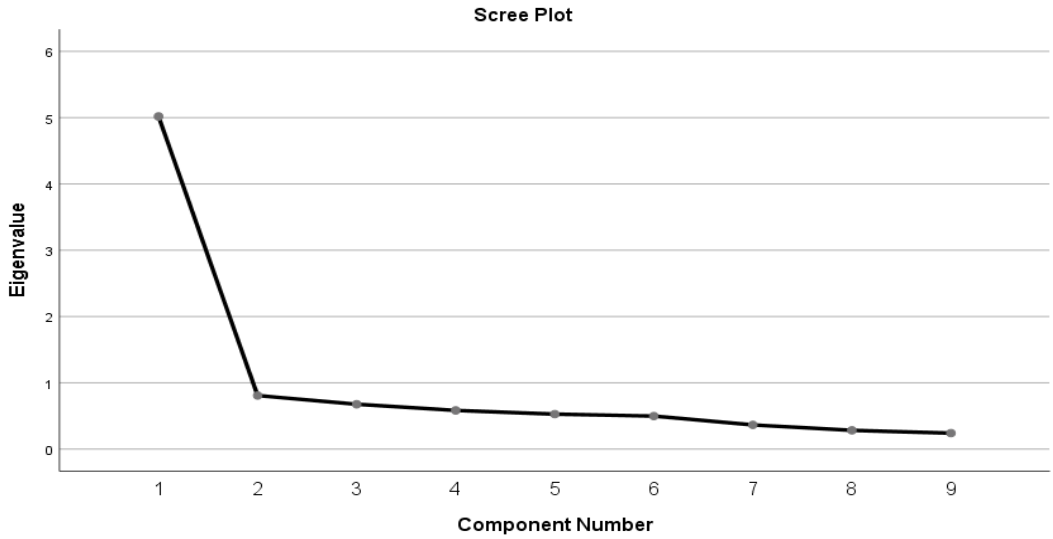


Figure 11: Normality Distribution for Question 18 Principal Component Analysis Factor One

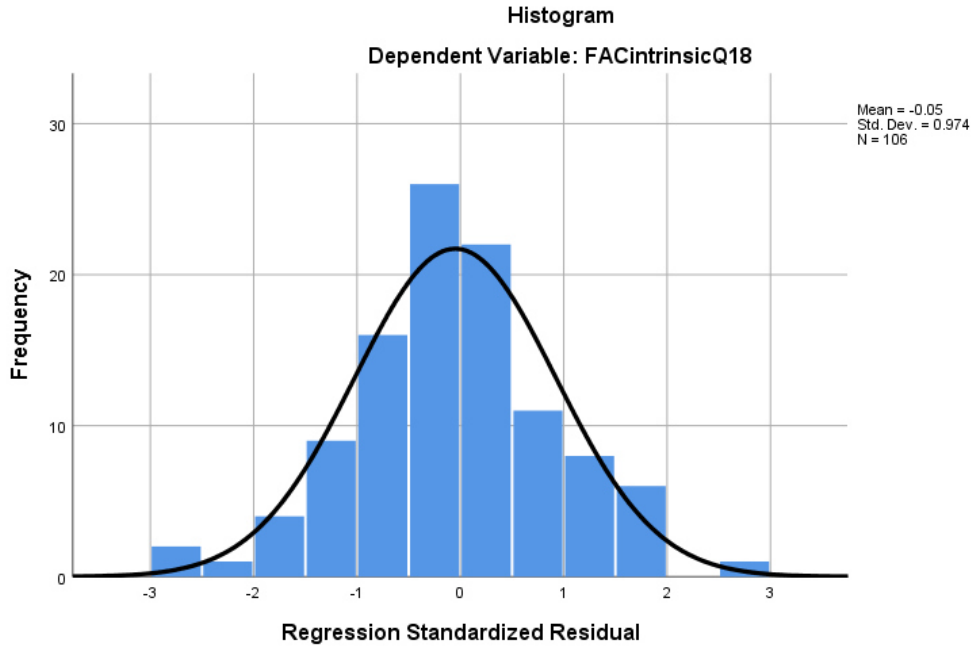


Table 67. Binary Logistic Regression: Clinical Instructor User/Nonuser

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	REGR factor score 1 for analysis 1	-.080	.190	.179	1	.672	.923
	Constant	-.196	.189	1.069	1	.301	.822

a. Variable(s) entered on step 1: REGR factor score 1 for analysis 1.

Table 68. T-test Results for Subset of Physical Therapist Student and Clinical Instructor Data Set

CI Grouping	PT Student Variable	n1/n2	T-Statistic	PT Student Variable	n1/n2	T-Statistic	PT Student Variable	n1/n2	T-Statistic
Gender	ConfSel Delta	10/13	.829	ConfAdm Delta	10/13	1.29	ConfInt Delta	9/13	1.252
Gender	ValueTests	10/13	-.038						
APTA	ConfSel Delta	11/12	-1.103	ConfAdm Delta	11/12	.687	ConfInt Delta	10/12	.064
Entry level degree	ConfInt Delta	10/14	.041	ConfAdm Delta	10/14	.939	ConfInt Delta	9/14	-.343
Q18 C1	ConfSel Delta	14/7	-.408	ConfAdm Delta	14/7	-1.994	ConfInt Delta	14/6	-2.132*
Q18 C1	ValueTests	14/7	-.629						
Q20 C1	ConfInt Delta	10/11	-.627	ConfAdm Delta	10/11	-1.329	ConfInt Delta	9/11	.036
Q20 C2	ConfSel Delta	12/9	-.314	ConfAdm Delta	12/9	-.748	ConfInt Delta	11/9	.696
Q20 C3	ConfInt Delta	10/11	-.078	ConfAdm Delta	10/11	-.713	ConfInt Delta	10/10	-1.116
Q20 C4	ConfSel Delta	9/12	-.235	ConfAdm Delta	9/12	-.411	ConfInt Delta	9/11	.036

*significance at p=.047
Q18 CI= Principal Component Factor 1 from items in Question 18
Q20 C1= Principal Component Factor 1 from items in Question 20
Q20 C2= Principal Component Factor 2 from items in Question 20
Q20 C3= Principal Component Factor 3 from items in Question 20
Q20 C4= Principal Component Factor 4 from items in Question 20
ConfSelDelta=Confidence in selection of standardized measures delta
ConfAdmDelta=Confidence in administration of standardized measures delta
ConfIntDelta=Confidence in interpretation of standardized measures delta
APTA= American Physical Therapy Association

Appendix 6: Consent for Participation in Interview Research

The email request to CIs and PT students to participate in interviews based on interest presented at the time of survey completion was as follows:

Subject Line: Phone interview – Follow-up from recent survey participation
You participated in a survey recently related to your use of standardized tests and measures and attitudes and beliefs related to their value. You expressed willingness to participate in a follow up interview to explore this topic and your experience on clinicals a bit further. Thank you!

Please email me back to set up a phone interview - time/date at your convenience. Attached to this email is a copy of the consent to participate. You can feel free to sign and scan back or simply indicate in your email response that you have read this and consent to participate in the body of the email.

Thank you SO MUCH for providing me with your support thus far and I hope to hear from you!

The following was attached to the email recruitment based on group status:

Consent for Participation in Interview Research for Clinical Instructors

CONSENT FOR PARTICIPATION IN INTERVIEW RESEARCH:
Documentation of Informed Consent to Participate in Research
Project Title: Influence of clinical instructor and physical therapist student characteristics on the use of standardized measures in clinical practice
Researcher(s): Vicki LaFay, PT, DPT, CSCS, CEEAA
Clarkson University Institutional Review Board (IRB) approval number: 17-38
Approval valid until: May 23, 2019
Nova Southeastern University Institutional Review Board (IRB) approval number: 2017-419

You have been asked to be a part of the research described here. Participation is voluntary.

The purpose of this study: This project is designed to gather information about your experience as a CLINICAL INSTRUCTOR, your expectations for this recent experience and to explore factors that contribute to or challenge you feeling successful and competent as a CI and in practice, specifically the evaluation, treatment and reassessment of patients. These interviews, with both clinical instructors and PT students may help align expectations, teaching strategies and preparation for clinical practice. I understand I will be one of approximately 10 people being interviewed for this research.

What to expect: The interview will last approximately 60 minutes. Notes may be taken during the interview. An audio tape of the interview will help ensure accuracy in the transcription of the interview. If I don't want to be taped, I will not be able to participate in the study. I will be provided a copy of my transcript to review for accuracy and a summary of the interview will also be shared with me, at my request, to ensure the researcher's interpretation of the overall interview is consistent with my intent. I have the authority to opt out of participation in this research project if any revisions to transcripts or the interview summary do not meet my approval. I may receive a copy of published research from this project at my request and may contact the primary investigator if have any questions related to my participation in this research.

I have up to two weeks after participation in the interview to communicate vial email to vlafay@clarkson.edu my desire to withdraw, for any reason, from participation in this study.

If you have any questions about this research, you may contact Dr. Vicki LaFay (315) 268-3787 or vlafay@clarkson.edu.

Risks and discomforts to you if you take part in this study: I understand that most interviewees will find the discussion interesting and thought-provoking. If, however, I feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview. If I choose to be interviewed in a public location, I am aware that my participation in this research may be known to others.

The benefits to you if you take part in this study: A potential benefit of participating is that you may become aware of your perceptions and behaviors associated with using standardized measures in clinical practice. Knowledge gained from this study may provide a clearer picture of the current state of standardized measure utilization in PT practice, guide efforts to advance standardized measure use, and aid academic programs in establishing priorities and teaching strategies for standardized measure education for entry-level practice.

What will you receive for taking part in this study: My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time during the interview without penalty. If I decline to participate or withdraw from the study, no one will be informed.

What will happen to the information collected in this study: The information collected will be kept confidential as much as is permitted by law. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. It is possible than an interviewee may reveal details that, even in absence of their name,

may make them identifiable. The primary investigator will make every effort to ensure confidentiality. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions. These policies include the provision of adequate safeguards to ensure your data is only used for the specified purpose and can only be accessed by the identified investigators. All manual and electronic data will be maintained under comprehensive security and access controls that include password-protection for computers and electronic hard drives and locked cabinets for archiving of manual and electronic data. Personally identifiable information such as name, email address, and phone number will be destroyed within one year of data collection. Coworkers, employers or students will neither be present at the interview nor have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.

What rights do you have when you take part in this study: Participation in this research is voluntary. Deciding not to take part, or to stop being a part of this research will result in no penalty, fine or loss of benefits that you otherwise have a right to. If you have questions about your rights as a research subject or if you wish to report any harm, injury, risk or other concern, please contact Dr. Johndan Johnson-Eilola, Chair of the Clarkson University Institutional Review Board (IRB) for human subjects research: (315) 268-6488 or johndan@clarkson.edu or Dr. William Smith, Director of the Nova Southeastern University Institutional Review Board (IRB) for human subjects research" (954) 262-5311 or wsmith2@nova.edu .

Conflict of Interest: The researchers have no financial interest in performing this study.

Informed Consent: Please sign here to show you have had the purpose of this research explained and you have been informed of what to expect and your rights. You should have all your questions answered to your satisfaction. Your signature shows that you agree to take part in this research. By signing below you also attest that you are at least 18 years old. You will be given a copy of this consent form to keep for your records.

Signature of volunteer:

Date:

Signature of researcher obtaining informed consent:

Date:

Consent for Participation in Interview Research for PT Students

CONSENT FOR PARTICIPATION IN INTERVIEW RESEARCH:
Documentation of Informed Consent to Participate in Research
Project Title: Influence of clinical instructor and physical therapist student characteristics on the use of standardized measures in clinical practice
Researcher(s): Vicki LaFay, PT, DPT, CSCS, CEEAA
Clarkson University Institutional Review Board (IRB) approval number: 17-38
Approval valid until: May 23, 2019
Nova Southeastern University Institutional Review Board (IRB) approval number: 2017-419

You have been asked to be a part of the research described here. Participation is voluntary.

The purpose of this study: This project is designed to gather information about your experience as a STUDENT, your expectations for this recent experience and to explore factors that contribute to or challenge you feeling successful and competent in practice, specifically the evaluation, treatment and reassessment of patients. These interviews, with both clinical instructors and PT students may help align expectations, teaching strategies and preparation for clinical practice. I understand I will be one of approximately 10 people being interviewed for this research.

What to expect: The interview will last approximately 60 minutes. Notes may be taken during the interview. An audio tape of the interview will help ensure accuracy in the transcription of the interview. If I don't want to be taped, I will not be able to participate in the study. I will be provided a copy of my transcript to review for accuracy and a summary of the interview will also be shared with me, at my request, to ensure the researcher's interpretation of the overall interview is consistent with my intent. I have the authority to opt out of participation in this research project if any revisions to transcripts or the interview summary do not meet my approval. I may receive a copy of published research from this project at my request and may contact the primary investigator if have any questions related to my participation in this research.

I have up to two weeks after participation in the interview to communicate vial email to vlafay@clarkson.edu my desire to withdraw, for any reason, from participation in this study.

If you have any questions about this research, you may contact Dr. Vicki LaFay (315) 268-3787 or vlafay@clarkson.edu.

Risks and discomforts to you if you take part in this study: I understand that most interviewees will find the discussion interesting and thought-provoking. If, however, I

feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview. If I choose to be interviewed in a public location, I am aware that my participation in this research may be known to others.

The benefits to you if you take part in this study: A potential benefit of participating is that you may become aware of your perceptions and behaviors associated with using standardized measures in clinical practice. Knowledge gained from this study may provide a clearer picture of the current state of standardized measure utilization in PT practice, guide efforts to advance standardized measure use, and aid academic programs in establishing priorities and teaching strategies for standardized measure education for entry-level practice.

What will you receive for taking part in this study: My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time during the interview without penalty. If I decline to participate or withdraw from the study, no one will be informed.

What will happen to the information collected in this study: The information collected will be kept confidential as much as is permitted by law. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. It is possible than an interviewee may reveal details that, even in absence of their name, may make them identifiable. The primary investigator will make every effort to ensure confidentiality. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions. These policies include the provision of adequate safeguards to ensure your data is only used for the specified purpose and can only be accessed by the identified investigators. All manual and electronic data will be maintained under comprehensive security and access controls that include password-protection for computers and electronic hard drives and locked cabinets for archiving of manual and electronic data. Personally identifiable information such as name, email address, and phone number will be destroyed within one year of data collection. Coworkers, employers or students will neither be present at the interview nor have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.

What rights do you have when you take part in this study: Participation in this research is voluntary. Deciding not to take part, or to stop being a part of this research will result in no penalty, fine or loss of benefits that you otherwise have a right to. If you have questions about your rights as a research subject or if you wish to report any harm, injury, risk or other concern, please contact Dr. Johndan Johnson-Eilola, Chair of the Clarkson University Institutional Review Board (IRB) for human subjects research: (315) 268-6488 or johndan@clarkson.edu or Dr. William Smith, Director of the Nova Southeastern

University Institutional Review Board (IRB) for human subjects research" (954) 262-5311 or wsmith2@nova.edu .

Conflict of Interest: The researchers have no financial interest in performing this study.

Informed Consent: Please sign here to show you have had the purpose of this research explained and you have been informed of what to expect and your rights. You should have all your questions answered to your satisfaction. Your signature shows that you agree to take part in this research. By signing below you also attest that you are at least 18 years old. You will be given a copy of this consent form to keep for your records.

Signature of volunteer:

Date:

Signature of researcher obtaining informed consent:

Date:

Appendix 7: Clinical Instructor Interview Protocol

Interview Protocol: Clinical Instructor

Introduction:

Thank you for taking the time to talk with me today. As you know from our prior communications, my name is Vicki LaFay and I am a PhD candidate at Nova Southeastern University. The purpose of this interview is to learn about your experiences as a Clinical Instructor (CI). I hope to understand your role as a CI and your expectations for student experiences, whether this is consistent with your actual experience, and to explore factors that contribute to or challenge you as a CI and as a clinician in practice. These interviews with both clinical instructors and PT students may help align expectations, teaching strategies and preparation for clinical practice.

I will ask you a series of predetermined questions and may follow up with some additional questions to understand your responses fully. We have planned this interview to take about an hour. There are no right or wrong answers, or desirable or undesirable answers. I would like you to feel comfortable saying what you really think and how you really feel.

If it is okay with you, I will record our conversation since it is hard for me to write everything down while simultaneously carrying on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be compiling a report that will contain all students' comments without any reference to individuals.

Before we get started, as a reminder from the information sheet you received when you expressed interest in participating in this study and a consent form for participation in this study, you were informed that: (1) all information will remain confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm. After you review them, I would be happy to answer any questions you may have.

Do you have any questions about the interview process before we get started?

Interview:

Reflect on your experience as a CI, either in general or based on your last student completing final clinical requirements before graduation.

Q1: How would you describe your overall experience being a CI, for this recent experience or overall?

Q2: Is this consistent with what you expected of this experience or, more broadly, of being a clinical instructor?

YES NO → Q2b: Why not? Can you provide some examples of this?

Q2a: Why? Can you provide some examples of this?

Q3: What led you to become a CI? What is most valuable to you from being a CI? What is most challenging about being a CI?

Q4: What has most influenced the way you practice? How do you share this with students? Consider your prior academic and clinical experiences, continuing education, mentors, etc.

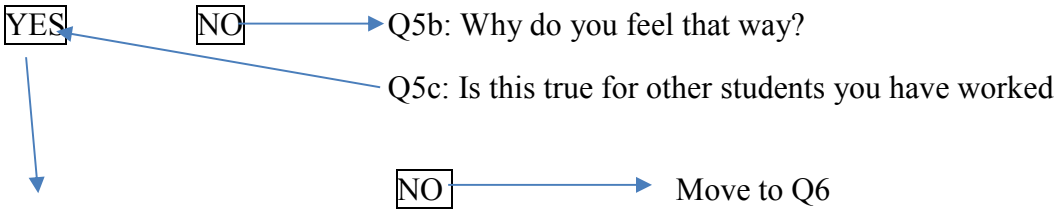
Q5: What challenges or barriers, if any, do you experience in providing patient care in your clinical practice?

If reports no challenges or barriers, move to Q5.

If reports challenges or barriers, probe for additional details about those identified

Q4a: Please tell me more about this….

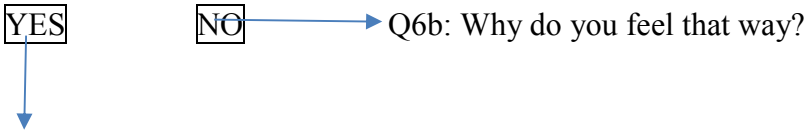
Q6: Do you feel you have influenced the way the student you just instructed will practice?



Q5a: How have you influenced the way your student practices?

Q5a.1: Can you provide some examples of this?

Q7: Does being a CI influence the way you practice?



Q6a: How have students influenced the way you practice?

Q6a.1: Can you provide some examples of this?

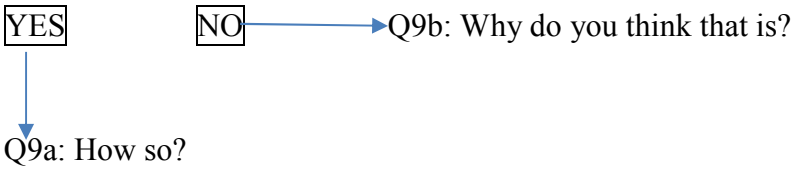
Q8: Lets now speak more directly to the use of standardized tests and measures. Tell me about what factors into you using or not using standardized measures in your clinical practice.

Follow up with probes as appropriate

Q9: What do you feel most influences your use of standardized measures?

Q8a. Can you tell me more about that?

Q10: Do you feel standardized tests and measures are valuable to PT practice? Do students influence the way you use or feel about the use of standardized measures?



Closing: Is there anything else you think is important about being a clinical instructor, clinical practice and patient management, or standardized measures that we have not talked about?

If it all right with you, I will send you a copy of the interview transcript along with a summary of key points that I felt were important to you. Your feedback on the accuracy of the transcript and my interpretation of the interview would be valuable to me.

Thank you for your time today. You can reach me through this email address and phone number (*business card to be provided*) if you need to contact me.

Appendix 8: Physical Therapist Student Interview Protocol
Interview Protocol: Student

Introduction:

Thank you for taking the time to talk with me today. As you know from our prior communications, my name is Vicki LaFay and I am a PhD candidate at Nova Southeastern University. The purpose of this interview is to learn about your clinical experiences as a PT student. I hope to learn more about your clinical experiences, whether what you expected was consistent with your actual experience, and to explore factors that contributed to or challenged you. These interviews with both clinical instructors and PT students may help align expectations, teaching strategies and preparation for clinical practice.

I will ask you a series of predetermined questions and may follow up with some additional questions to understand your responses fully. We have planned this interview to take about an hour. There are no right or wrong answers, or desirable or undesirable answers. I would like you to feel comfortable saying what you really think and how you really feel.

If it is okay with you, I will record our conversation since it is hard for me to write everything down while simultaneously carrying on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be compiling a report that will contain all students' comments without any reference to individuals.

Before we get started, you received a copy of the information sheet when you expressed interest in participating in this study and a consent form for participation in this study. Essentially, this document states that: (1) all information will remain confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm. After you review them, I would be happy to answer any questions you may have. *Wait for response.*

Do you have any questions about the interview process before we get started? Do I have your verbal consent to proceed?

Interview:

Reflect on your experience as a student completing your final clinical requirements before graduation.

Q1: How would you describe your clinical experiences and what they contributed to your journey to becoming a PT?

Q2: Was what you experienced consistent with what you expected of your clinical education experiences or, more broadly, of PT clinical practice? YES

NO Q2b: Why not? Can you provide some examples of this?

Q2a: Why? Can you provide some examples of this?

Q3: What or whom has most influenced the way you will practice now that you have graduated? Consider your prior academic, current and prior clinical experiences, resources or tools, mentors or anything else when responding.

Q3a. Did anything or anyone facilitate this?

YES NO → Move to Q4

↓

Q3a.1: Tell me more about that….

Q4: What challenges or barriers, if any, did you experience as a student PT? What challenges or barriers do you feel you may experience as you begin working?

If reports no challenges or barriers, move to Q5.

If reports challenges or barriers, probe for additional details about those identified

Q4a: Please tell me more about this….

Q5: Do you feel your CI has influenced the way you will practice?

YES NO → Q5b: Why do you feel that way?

↓

Q5a: Can you provide some examples of this?

Q6: Do you feel you have influenced the way your CI practices?

YES NO → Q6b: Why do you feel that way?

↓

Q6a: Can you provide some examples of this?

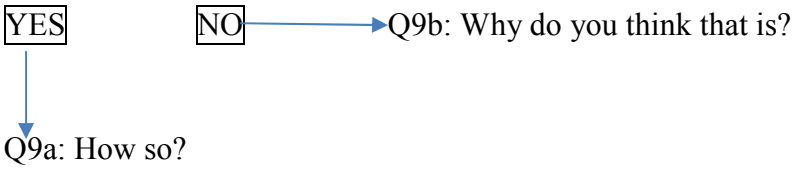
What is your biggest positive take away from your clinical experiences?

Lets now speak more directly to the use of standardized tests and measures.

Q7: Do you feel standardized tests and measures are valuable to PT practice? Were they valuable to the clinics you completed your clinical experiences? What do you feel most influenced the use of standardized tests and measures for your CI? Were you given autonomy in the choice of STM?

Q7a. Can you tell me more about that? For each…

Q9: Do you feel your CI valued the use of standardized tests and measures as an element of evidence-based practice? DO you feel you influenced the way your CI uses or feels about the use of standardized measures?



Q8: Based on your experience, what factors do you anticipate having the greatest impact on how, when or why you will use standardized measures now that you have graduated?"

Q8a. Why do you think that is?

Closing: Is there anything else you think is important about your clinical experience, clinical practice and patient management, or standardized measures that we have not talked about?

If it all right with you, I will send you a copy of the interview transcript along with a summary of key points that I felt were important to you. Your feedback on the accuracy of the transcript and my interpretation of the interview would be valuable to me.

Thank you for your time today. You can reach me through this email address and phone number (business card to be provided) if you need to contact me.

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